

MODERN HOSPITALS.

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Read before the Royal Institute of British Architects, Monday, 17th February 1913.

WHEN the Council honoured me with an invitation to read a Paper upon modern hospitals, in conjunction with Mr. Milburn,* I accepted it with pleasure, though it must be acknowledged it seemed difficult to divide the subject in a satisfactory manner. Mr. Milburn has elected to give you a brief description, illustrated by many plans, of hospitals erected within the last ten years; and as his work and studies are so well known, you will look with confidence for an interesting and instructive Paper. I may remind you of the excellent account he has already given of his studies of German hospitals.

The promoters of the newest hospital are generally anxious that it should embody the latest improvements and be just a little better than the last built. To this end there is much visiting of existing hospitals and study of plans and reports; and so it does happen that mistakes are noted for avoidance, and good features for adoption, or improvement maybe. Modern hospitals certainly show evidence of the thought and labour spent by medical men and architects in this way.

On the other hand, the study of mere forms is not so illuminating as that of the principles upon which they were based. Without a thorough grasp of principles we are liable to perpetuate the mistakes made by those who have preceded us.

It is with no great confidence in my own powers that I venture this evening to offer some more or less abstract observations upon the general arrangement and construction of hospital wards, with particular reference to principles which were enunciated as long ago as the early part of the nineteenth century, and which—so it seems to me—still await their fullest development.

The present and coming generations may learn with advantage the lessons taught by an array of brilliant thinkers and workers, as the result of experience gained in strenuous times when there were few text-books but much practical experience in situations and under circumstances which led them to recognise and rely upon Nature as the great healer. Miss Nightingale, De Chaumont, Galton, Morin, Husson, Tollet, Parkes, and even earlier authorities, may be studied to this day with advantage.

It takes a long time to translate principles into general practice, probably because we fail at first to grasp them thoroughly, or perhaps old practice dies hard. We pride ourselves upon the care with which in these days we avoid all mouldings and dust-collecting internal angles;

* See Mr. Milburn's Paper, p. 281.

and yet the general principle was stated by Miss Nightingale at least fifty years ago. Other equally good principles have been so far adopted in a tentative way only.

There is not much to choose in this respect between English hospitals and those in other countries. We have concentrated upon sanitary fittings and what I may call local cleanliness. We also take great care in excluding soil-tainted air from wards. On the Continent better provision is made for space in and around the ward blocks. We have much to learn in this respect from France and Germany; and they from us, in the matter of sanitary fittings.

As an example of what may be done by inter-study, I would draw your attention to the new Rothschild Hospital, now nearing completion in Paris, and designed by my friend M. Bach-

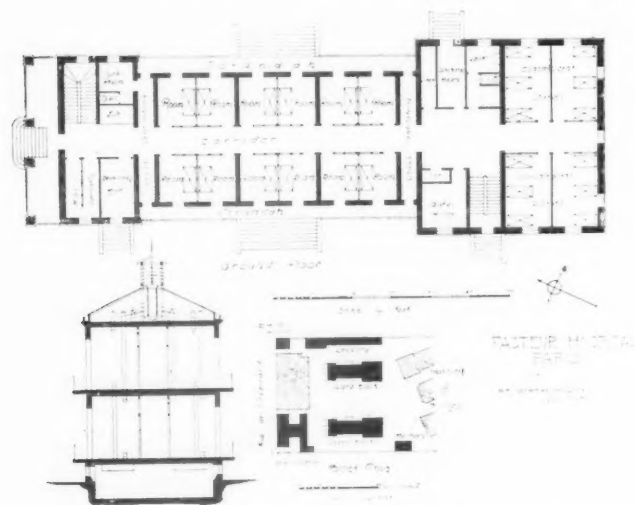


FIG. 1.—PASTEUR HOSPITAL, PARIS. (Architect, M. Florentine Martin.)

mann. He is a great admirer of many things English, and in this hospital has endeavoured to combine many of the best features in hospital planning and detail which obtain in both countries. The building is of considerable interest. I know that he desired to adopt other English features, but custom dies as hard in France as it does here.

The modern type of hospital may be said to have taken its rise shortly after the Crimean War, and as the result of experience gained in that disastrous campaign. The pavilion type was adopted, and it holds the field to this day. Tollet says that this form of ward was suggested as far back as 1750.

The pre-pavilion type is extinct and no longer of interest except in an archaeological sense. Hospitals were mere collections of rooms, large and small, with little or no arrangement or plan specially adapted to the purposes of housing sick people. The

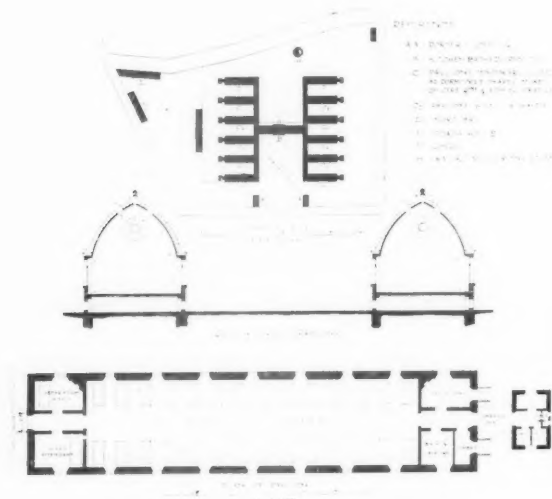


FIG. 2.—MILITARY HOSPITAL, BOURGES, FRANCE

administration offices and sanitary conveniences were all more or less in direct communication with the sick rooms. That is not to say they were badly planned for their day; but medical

science and the art of surgery were in an undeveloped state as compared with the present day, and the importance of environment for sick people was not then realised.

Two other great wars—the American Civil War and the Franco-German War—stimulated progress in hospital planning and construction, and, although medicine and surgery had advanced very greatly since the Crimean War, these later wars again brought out the advantages of fresh air in abundance, and the speedy removal of foul emanations from the neighbourhood of the sick. Once more the efficiency of isolated buildings widely spaced was made apparent, and we find this type of ward unit adopted in the great hospitals in Berlin, Hamburg, Montpellier, Bourges, &c. [figs. 5, 6, 8, 2].

It would seem that in periods of long-continued peace there is a tendency to go back upon the lessons learned in the strenuous times of war, and to modify planning in the interests of mere convenience and concentration. Then it is that we find virtues in high buildings—economy of ground and of construction, easier supervision, and a number of other desirable matters the effect of which is incidental only.

The extent to which concentration in buildings affects cost and convenience of administration, or even the initial cost of hospital buildings, is, however, more apparent than real. I shall have something to say upon this point further on.

Naturally during the last thirty years the advances in medicine and surgery, and more particularly in bacteriology, have had their effect upon the arrangement and construction of hospitals, though

not to so great an extent as at one time seemed possible. Bacteriology has not discounted the value of fresh air and sunlight; it has explained and emphasised it. Lister's antiseptic treatment led to a more complete realisation of the value of aseptic conditions in wards and sick rooms; and all parts are now designed so as to be easily kept clean. With solid walls and floors we have done away with innumerable dust-collecting and germ-breeding areas.

It is odd, by the way, that sash-framed windows have so long escaped general condemnation. Personally, I have discarded them altogether in favour of solid hard-wood or steel casements. Other forms are also being adopted. Sash windows, if required, can now be made entirely in metal.

The number and extent of administrative and other buildings not actually occupied or used

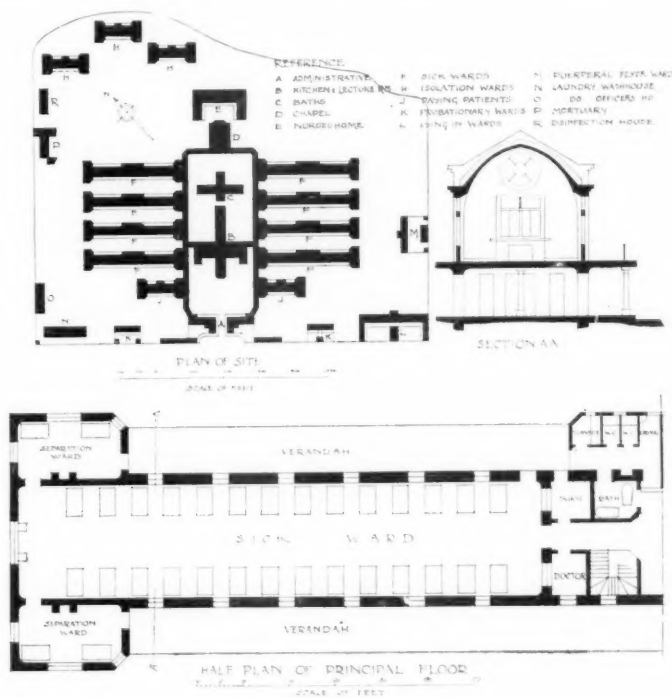


FIG. 3.—ST. ELOI HOSPITAL, MONTPELLIER.

by the patients have been largely increased in late years. We employ a large number of nurses, for whom more (and much better) accommodation is required. Engineering enters so much into the work and maintenance of a hospital that its buildings and equipment require much more room; and, what with baths, physical exercise halls, laboratories, and research rooms, the ward blocks tend to form a smaller proportion of the whole institution than was the case in earlier buildings.

Two notable attempts in planning of ward blocks have been made within the last thirty years—one to substitute circular wards for pavilions, and the other to group all the wards together, as illustrated at the Belfast General Hospital. To these should be added the glass-cased cubicles of the Pasteur Hospital [fig. 1] for treating different infectious diseases under one roof.

The idea of circular wards is not without fascination, but it has been adopted in but few cases. The costliness of its construction—to say nothing of drawbacks in the way of super-

vision—is against its general adoption. It is useful in constricted sites, and in the peculiar configuration of some urban hospitals.

The Belfast type is unique, and likely to remain so. It was designed to fit a system of mechanical ventilation which has—I venture to think fortunately—failed, so far, to secure general approval for use in connection with hospitals.

In justice to those who conceived these types, we must acknowledge their boldness and originality. In failure—and many do not regard these attempts in that light—more honour

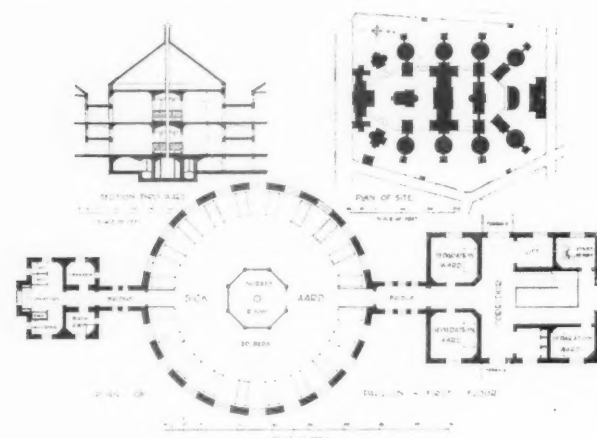


FIG. 4.—CIVIL HOSPITAL, ANTWERP.

may be won than in the safer successes of the mere copyist. The Pasteur Hospital has been copied and improved upon in this country, but so far the system has not made any great way.

Fig. 17 shows an adaptation of the idea which I designed in connection with the King's College Hospital Competition.

Much, then, as the design and arrangement of modern hospitals has been affected by the advance of knowledge and practice, the importance of fresh air in abundance and the speedy removal of foul emanations from the neighbourhood of the sick is still fundamental. Light—and especially sunlight—is recognised as of scarcely less value. Add to these cleanliness in everything, from bedding to cooking utensils, and we have the main principles which form the basis of good hospital work.

Ventilation is but the means of keeping air fresh in enclosed spaces, heating a concession—and not always a wise one—to the debilitated forces of the sick and disorganised body; convenience of administration a question of economics.

A building—any building—is in itself an obstruction to light and air; but some means of shelter we must have against wind and rain and extremes of temperature. Subject to these limitations, the more air and sunlight we can get into our wards the better. Neither can be

obtained in the fullest degree without fairly large areas of land and wide spacing of ward blocks, so that air can move in large volumes around and, I may add, over and under the buildings with as little restriction as possible.

In this country we are niggardly in the area of hospital sites, for the obvious reason that land is costly, especially in and around cities, where large institutions are required. It is, indeed, too obvious to inspire complete confidence in its finality. I am inclined to think that what we may call ultimate cost is not reduced to any great extent by economy in the cost of the site, whilst the loss in light and air and means of efficient ventilation is real, if not at first sight very obvious.

Take, for instance, two of the latest and most magnificent hospitals erected within the last few years—Manchester Royal Infirmary [fig. 12] and King's College Hospital [fig. 13]; the latter is not yet finished. Both Mr. Edwin T. Hall and Mr. William Pite ardently desired, I am sure, a few more acres to give them better scope for the realisation of their ideas in hospital design; and none of us can help regretting that those who are responsible for the selection of those sites confined themselves to the minimum, and in the case of King's College less than the minimum area required.

This minimum was fixed many years ago to one acre to fifty patients; but I can scarcely believe that it contemplated room for all the additional buildings required for out-patients and medical schools. It was laid down at a time when the area occupied by administrative and other accessory buildings was very much less than that of the sick wards. At the present day the proportion has been considerably reduced, and, indeed, in the smaller hospitals the sick wards occupy the smaller space. 1

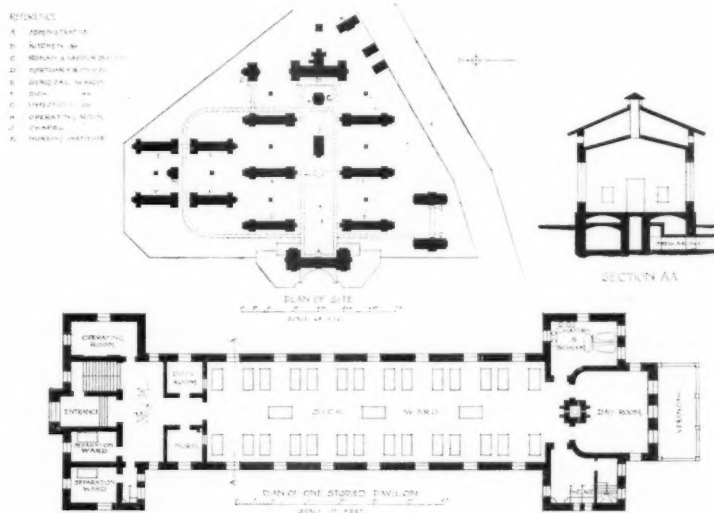


FIG. 5.—BERLIN GENERAL TOWN HOSPITAL.

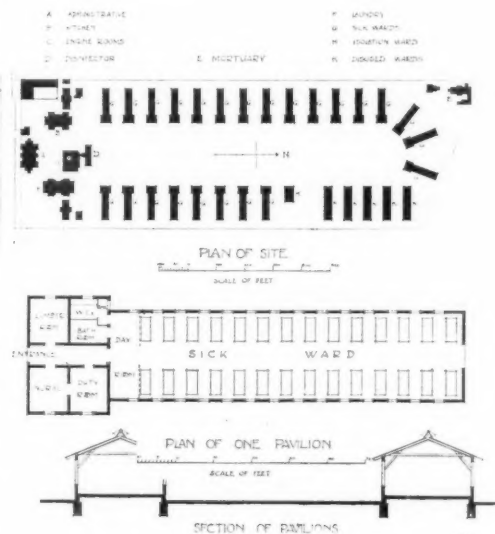


FIG. 6.—THE MOABIT HOSPITAL, BERLIN

think we should have a new rule setting forth the area required for the pavilions exclusive of that occupied by accessory buildings. In both Germany and France they are generally far more generous in the matter of site areas.

At Hamburg (Eppendorf) the proportion is only thirty-seven beds to the acre, at Nuremberg forty, Berlin (Friedrichshain) thirty-two, Charlottenburg thirty-seven, Heidelberg forty. In France there is St. Denis twenty-six, Montpellier twenty-seven. The Johns Hopkins Hospital at Baltimore, U.S. [fig. 10], has only twenty-six to the acre.

In and around cities hospitals might be placed with advantage in the centre of some of the public parks. But what mountains of prejudice would have to be overcome! What an outcry it would raise against an invasion of sacrosanct principles, the impossibility of devoting public land to privately governed institutions, hot-beds of disease in the midst of the cities' lungs (as if whatever damage can arise from hospital buildings is not far more potent in crowded areas!), and all that kind of solemn nonsense, which sounds so well on the platform, and has so little real value in sober reasoning.

In the treatment of tubercular disease fresh air and sunlight are of first importance. External heating is reduced to a minimum. Mechanical ventilation and heating would not even be considered. The patients are, indeed, trained to live in as cold a temperature as the resisting power of their bodies will permit with safety; and there are indications that this treatment will be extended—more or less modified, of course, according to circumstances—to all diseases. Even pneumonia has been successfully treated in the open air. That air—and plenty of it—is of vastly more importance than temperature appears to have been shown again and again under circumstances in which no heating at all was possible.

Miss Nightingale, quoting her experience in the Crimea, says:

In the hospital tents of the Crimea, although the sick were almost without shelter, without blankets, without proper food or medicines, the mortality was not above one-half what it was at Scutari; but these tents had only a few beds in each. Nor was it even so high as this in the small Balaclava General Hospital, which had part of its sick placed in detached wooden huts; while in the well-ventilated detached huts of the Castle Hospital, on the heights above Balaclava, exposed to the sea breeze, at a subsequent period, the mortality among the wounded did not reach three per cent.

Sir Douglas Galton, quoting Dr. Brocklesby and Sir John Pringle, says:

Hospital huts and tents, in which the patients were exposed to unfavourable conditions from cold and wet, produced more numerous and rapid recoveries from wounds during these wars, and from the diseases incidental to camps, than the permanent hospital buildings then in use.

But it was mainly in consequence of the experience of the Crimean War, the American War of Secession, and the Franco-German War of 1870-1, that physicians and surgeons generally became impressed with the importance of so arranging the buildings for sick and wounded that they should be constantly under the favourable influence of fresh air and cleanliness.

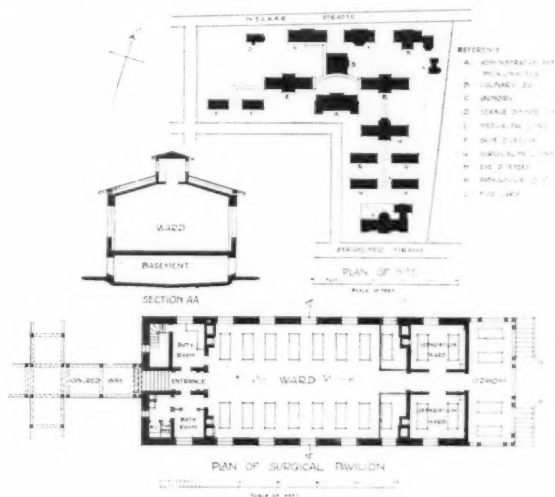


FIG. 9.—HEIDELBERG UNIVERSITY HOSPITAL.

Dr. Mouat, quoting Dr. Guy, tells how in 1758, owing to insufficient accommodation in the proper buildings,

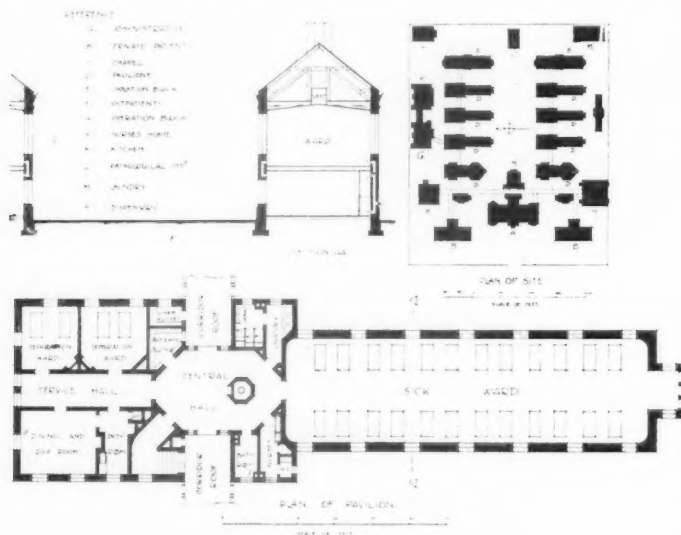
it was resolved to erect a temporary shed with deal boards upon the open forest; to thatch it with a coat of new straw, thick enough to keep out wind and rain, and to make it large enough for 120 patients. A country workman did the work (charging for the use of the boards) for £40. Here I quote Dr. Brocklesby's words, says Dr. Guy: "Although the hovel was finished in a fashion the most slovenly, and apparently inadequate to the end proposed, upon trial it was found that, notwithstanding most extraordinary cold as well as moisture, which the sick there lodged had suffered, remarkably fewer died of the same diseases, though treated with the same medicines and with the same general regimen, than died anywhere else; and all the convalescents recovered much sooner than they did in any of the warmer and closer huts and barns hired round Newport, where fires and apparently better accommodation of every sort could be provided for them."

I have not time to read to the end of this extraordinary account, which mentions several other experiments of a like kind.

This evidence of the efficacy of purely temporary structures almost suggests that palatial permanent buildings are quite unnecessary, if not wrong in principle. On the other hand,

temporary structures are never very satisfactory as buildings and they deteriorate quickly. There is no reason why permanent buildings should not be quite as efficacious for the cure of the sick and injured (which is the main object), if only they do not impede the free access of light and air. Both have, however, been subordinated to some extent to the supposed necessity for keeping up an equable temperature in wards.

I find in a Report on Modern Hospital Construction by Mr. John Begg [F.] to the Govern-



ward buildings should be exposed as much as possible to the air and sunlight; and this can be properly achieved only with one-story pavilions widely spaced on the site, and designed with few shadow-casting and air-obstructing projections. This has always been recognised in Germany and France, and in support I may be allowed to quote the late Henry Saxon Snell, in "Hospital Construction and Management," who, writing in 1889, says:

No country in the world has, up to the present time, made such progress towards a practical elucidation of the recognised principles of hospital construction as Germany. There, the development of the system of erecting sick-wards as single-storied isolated pavilions has for some years been fully carried out, and numerous examples of this mode of building are now, therefore, to be found in all parts of the country. France is slowly following the good example thus set to it in the hospitals erecting on M. Tollet's system.

England has not to the present time awakened to the obvious desirability of altering the present method of constructing its hospitals three, four, and five stories in height; and although the fact has long been generally recognised that the various blocks of sick wards should be kept well apart from one another, yet (except in one

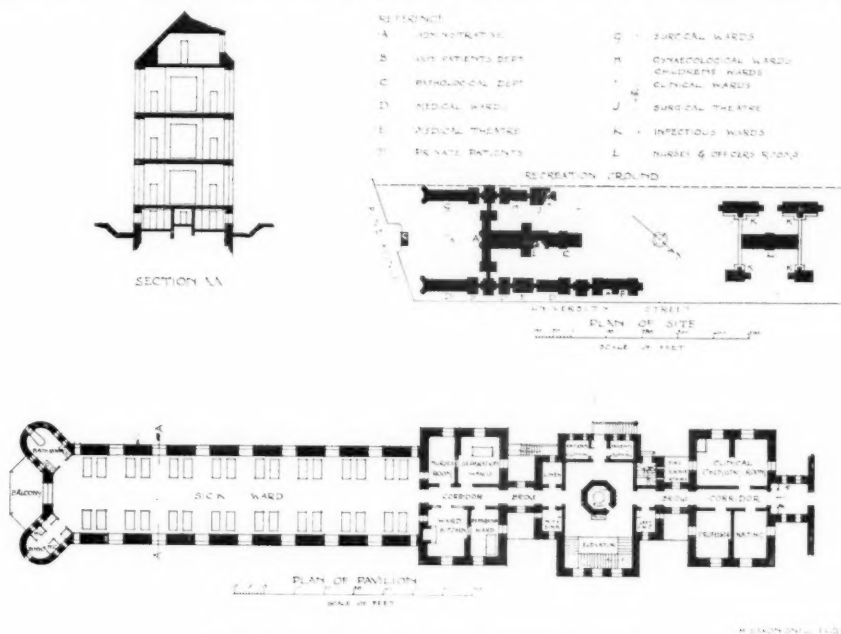


FIG. 11.—ROYAL VICTORIA HOSPITAL, MONTREAL, CANADA.

or two isolated instances) the separation is rendered incomplete through the intercommunication of the blocks by means of enclosed corridors. Complete separation has, however, been carried out in some of the hospitals for contagious diseases erected in different parts of England, and it is to be hoped that the system may shortly become more general.

This paragraph is quoted by Mr. John Begg in the report referred to above, and he remarks therein that it "shows very clearly, defines very concisely, what was considered the 'be-all and the end-all' of hospital construction at the period—separation, isolation, and ventilation." He does not disguise his opinion that these principles were out of date in 1904; and he quotes Dr. Renvers, of the Moabit Hospital, Berlin, "that the system of isolated one-story wards, while good for an infectious disease hospital, (is) most unsuitable for general purposes. It (is) wasteful of room, difficult of administration, and exposes the patients to risks of pneumonia."

Dr. Renvers has the courage of his convictions, for I am told that the old one-story wards of the Moabit are being replaced by three-story blocks; and, indeed, it would appear that one-story blocks are quite out of fashion in Germany, as may be seen in connection with some of the latest hospitals which will be shown by Mr. Milburn, though I am not forgetting the magnificent Virchow Hospital (Berlin), finished in 1906, and which has one-story blocks. In America, too, the newest hospital wards are two and three stories in height; but there, if I am not mistaken, mechanical ventilation is largely adopted.

These matters must necessarily be decided in principle by medical men. Architects who are interested in hospital building can do little more than watch the advance of these views, and be prepared to give effect to them in the most practical way. The design of a hospital

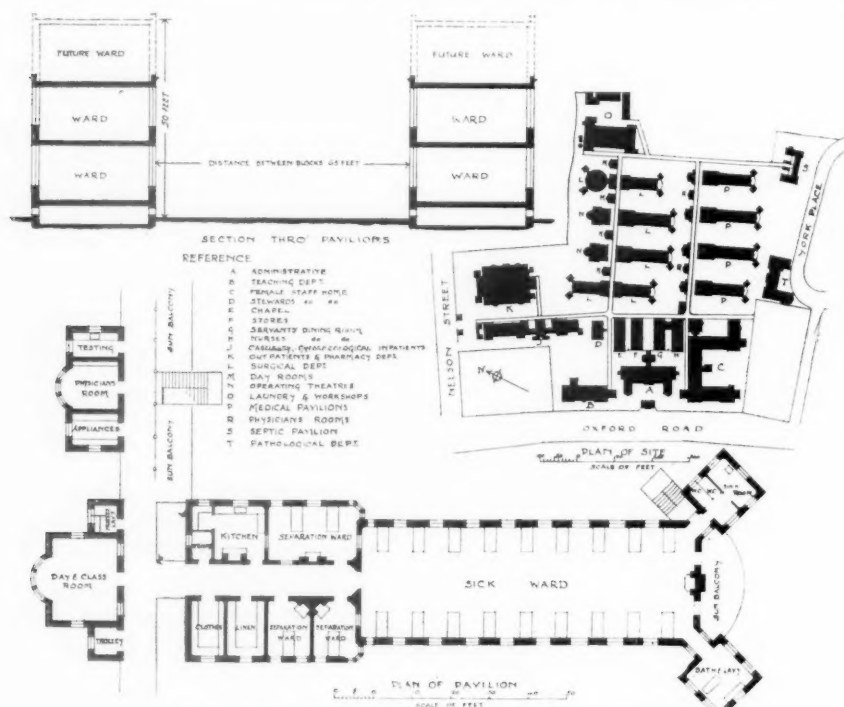


FIG. 12.—MANCHESTER ROYAL INFIRMARY. (Architect, Mr. Edwin T. Hall.)

is, or should be, always the joint work of the architect and physician or surgeon. Each has his own sphere and does well to keep within it.

In this connection I am glad to have the opportunity of acknowledging my debt in the building of Charing Cross Hospital to the late Dr. Murray and to Mr. Stanley Boyd, the senior surgeon of the hospital. I was indeed fortunate to be associated with so considerable an authority, and to his intimate knowledge of the best hospitals and the latest methods I owe most, if not all, that is noteworthy in the rebuilding of that hospital.

I have premised that one-story ward blocks without projections are to be preferred. If they are lifted well above the ground on arches, and either completely separated from other blocks, the air moves under, over, and around the whole exposed surface. They require a greater area of land than two- or three-story blocks, but not at all in proportion, as I can show

you by means of some rough diagrams made for the purpose (fig. 16). In each case I have allowed an air zone round each block equal in width to the height of the block. Thus the distance between any two blocks is just twice the height of one. You will notice, too, that the two- and three-story blocks are larger by just the area of the necessary staircase. I may as well acknowledge at once that the distance between the one-story blocks appears, nevertheless, to be inadequate, and in practice we should, no doubt, widen it if only as a matter of appearance.

We see, therefore, that one-story blocks require only about 25 per cent. more ground than blocks of three stories. Actually we should probably space the one-story blocks rather more widely; but then they would be even better for light and air.

This excess of 25 per cent. applies only to that part of the site occupied by ward blocks.

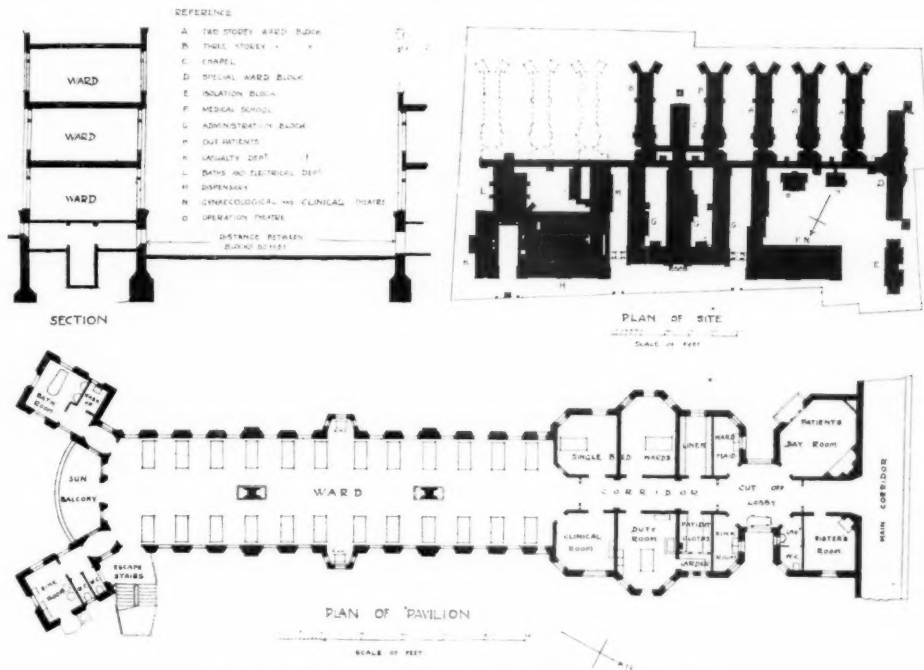


FIG. 13. - KING'S COLLEGE HOSPITAL. Architect, Mr. W. A. PITE.)

and in case of a hospital of, say, 500 beds, would amount to an additional one and a quarter acres. At £1,000 per acre, that would mean a little over £1,250, a very small proportion, indeed, of the total cost of the hospital. At £10,000 per acre it would mean £12,500 out of a total cost of, say, £250,000.

Apparently the length of corridor to be traversed from the two wards furthest apart is much greater in the case of one-story blocks, but if the flights of stairs necessary for two or more stories are measured in, there is very little difference; and we may also remember that the labour of mounting stairs is very much greater than walking on the flat—about twenty times, I believe. Of course, we have lifts, but they cost a good deal to instal, maintain, and run. Without lifts the balance is largely in favour of one-story blocks. Both time and energy are saved, as well as general upkeep and cleaning. More dirt collects upon staircases (and it is less easily removed) than in straight corridors.

Then as to the cost of the actual buildings. A two- or three-story block is no doubt rather less in cost, cube for cube, than a single-story block, because the cost of roof and foundations is about the same for three stories as one. On the other hand, walls are thinner and foundations less, and neither lifts, staircases, nor fire-escape staircases are required for one-story blocks, and the cost of these items goes a long way towards redressing the balance.

In one-story blocks the ward is practically surrounded by air. In three-story blocks one at least of the wards has only its sides and ends exposed.

A real sun room or balcony can be obtained at the south end without the disadvantage of overshadowing a lower ward. It is also possible to secure direct and powerful extraction shafts

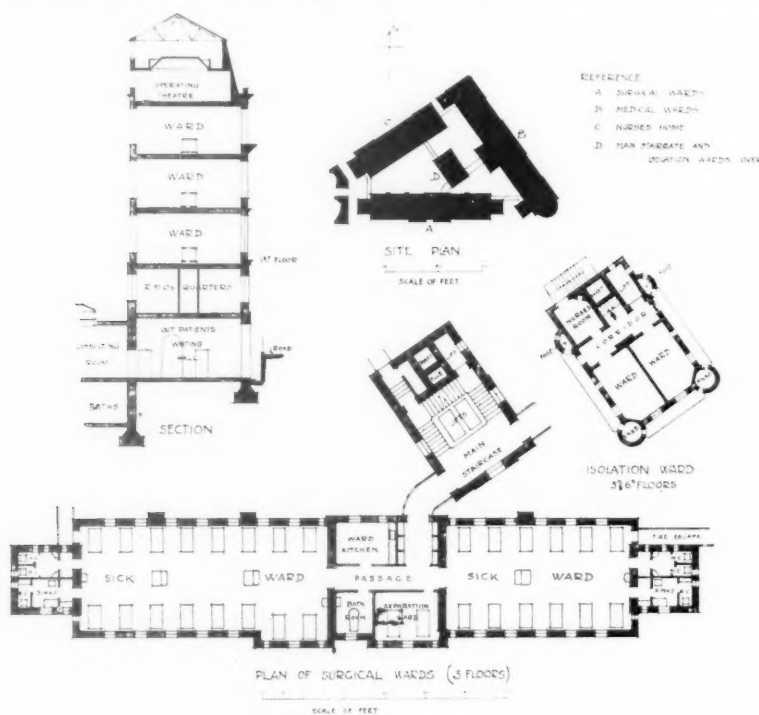


FIG. 14.—CHARING CROSS HOSPITAL. (Architect, A. Saxon Snell.)

for foul air at the top and along the centre of the ward, which is certainly the best position. No light-obstructing and hideous fire-escape staircase or bridge is required.

Lastly, it lends itself to a cross-section of the wards, which for purposes of ventilation appears to be almost ideal—i.e., the "forme ogivale" adopted by Tallet in several French hospitals—practically a Gothic arch and about 25 feet from the floor to the apex. His wards are also raised six or eight feet above the ground. Therein he overdid the principle, for the administration found later that this space under the wards could be closed in easily and usefully converted into stores, &c.

The extreme height of 25 feet seems unnecessary, too; as in enclosed spaces there is but little movement of the air beyond a height of 12 feet above the floor-level. I shall show you [fig. 18] a modification of this section, which was adopted with good results in one of the wards

at Charing Cross Hospital; and I may add that it has been found that the ventilation and temperature in this ward are more easily controlled than in the others which have the usual flat ceilings.

The ward unit, which comprises a large or associated sick ward, one or two separation wards, and the rooms and offices connected with them, differ but little in general arrangement in modern hospitals, yet the differences are interesting and instructive. Of the plans illustrated each comprises the block plan of a particular hospital and large scale plan and section of a ward unit.

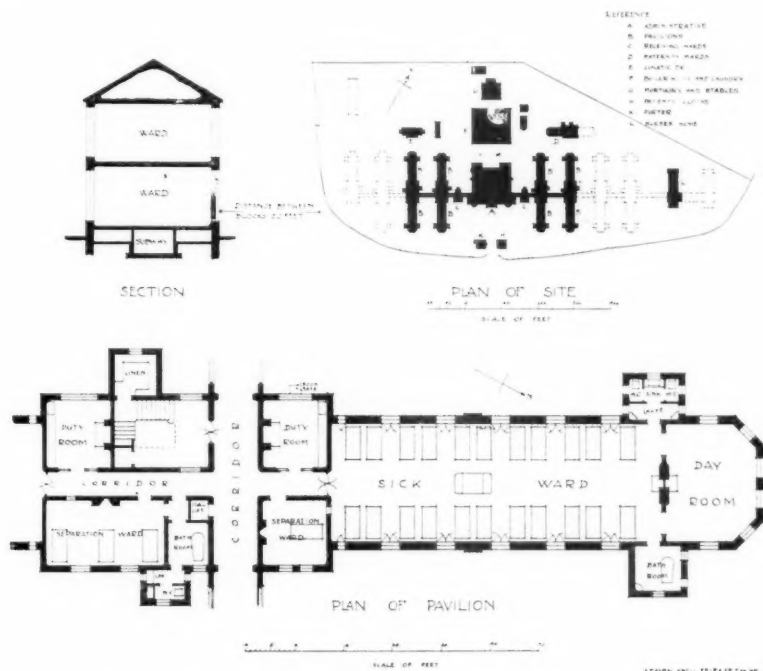


FIG. 15.—WILLESDEN PARISH INFIRMARY. (Architect, A. Saxon Snell.)

I am indebted to Mr. Edwin T. Hall, Mr. Percy Adams, Mr. William A. Pite, and others, for facilities in preparing some of these plans. These gentlemen and Messrs. Keith D. Young and Hall have designed some of the finest hospitals in this country.

Finally, I show a model plan of a ward unit [fig. 18]. I do not present it to you as in any way superior to those which have preceded it; but it serves to illustrate some of the points I have endeavoured to make in this Paper. It comprises a main sick ward for twenty beds, and separation wards for four beds. Many years ago we were advised that thirty-two was the maximum number of beds which could be superintended in one ward; but in modern practice it has been reduced considerably. The ward is 26 feet wide, with an average height of 13 feet, giving a cubic space per bed of 1,350 feet, or thereabouts. (With effective ventilation 1,000 feet is quite enough.)

The axis of this block is roughly north and south, and at the south end is a day or sun room, with large French windows, which can be turned right back to permit of its conversion to a covered verandah. It is low enough to allow of a high south window into the ward itself.

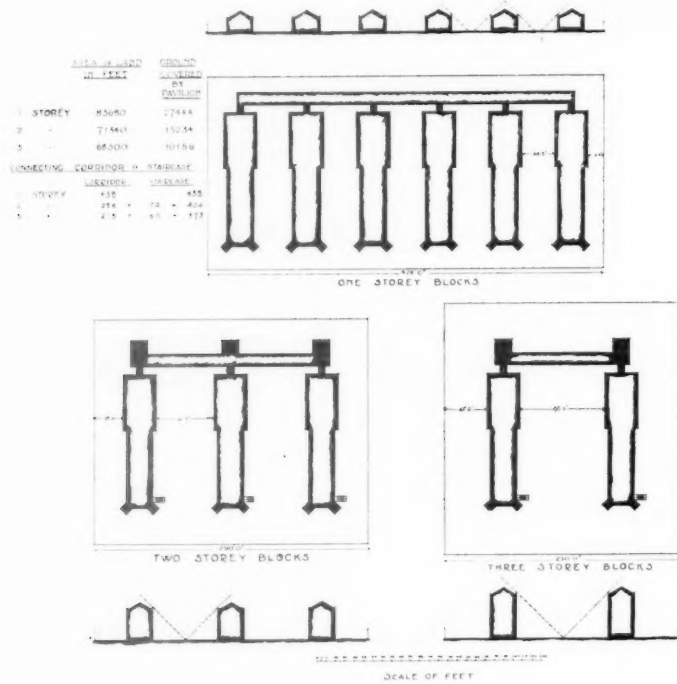


FIG. 16.—MODEL BLOCK PLANS, SHOWING AREAS OCCUPIED BY SIX-WARD UNITS (TWENTY-FOUR BEDS IN EACH) RESPECTIVELY WITH ONE-, TWO-, AND THREE-STORY BLOCKS. (A. Saxon Snell.)

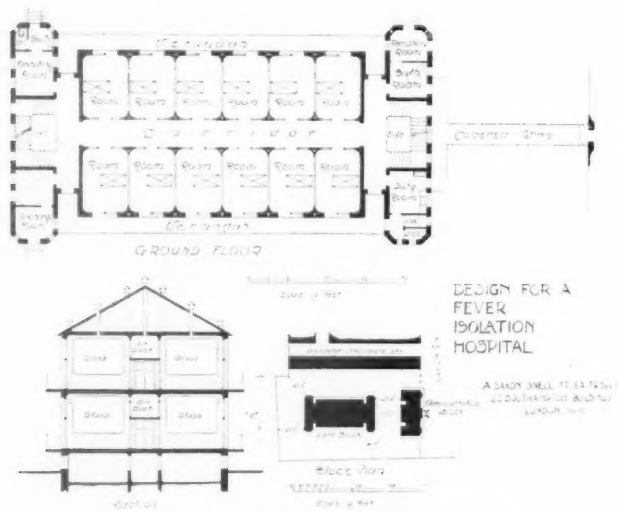


FIG. 17.—DESIGN FOR A FEVER ISOLATION HOSPITAL.

The conveniences for patients and nurses' sink-room are placed in an annexe, entered from a lobby at the north end of the ward, and convenient for use also by patients in the separation wards. So placed this annexe avoids shadowing the ward windows from the direct rays of the sun. The angle of incidence of the sun's rays in the early morning and afternoon allows penetration to a greater distance than is the case when it is at its meridian. The best average is obtained midway between the zenith and the rising and the setting. The direction of the rays at these times would be towards the south-east and south-west corners of the wards, and, oddly enough, it is just at these points that the sanitary annexes are so often placed.

In the winter, when sunlight is as valuable as it is restricted, the sun is at a low elevation, and it is then that a south window is so valuable. On this account the position of the day room

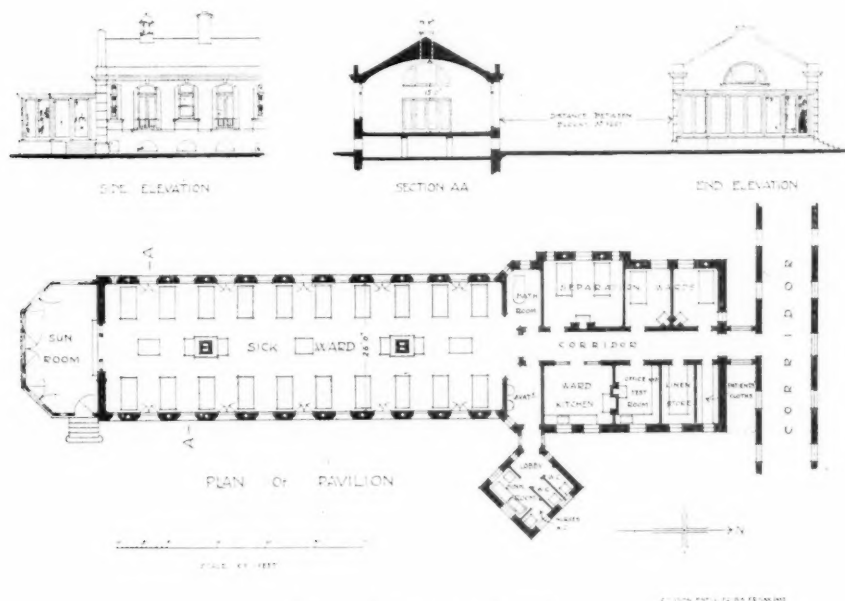


FIG. 18.—DESIGN FOR A PAVILION.

as shown on this plan may be criticised. It has, however, many other points in its favour, and in any case, as I have pointed out, a large south window opening direct into the ward is provided above the roof of the day room.

The bath-room is entered direct from the ward. It is, of course, often placed in an annexe with a cross-ventilated lobby between it and the ward, but this appears to be quite unnecessary.

Projecting sanitary annexes are in any case a nuisance, as they obstruct light and free movement of air round the wards, but for the patients' conveniences and sink-room we cannot safely dispense with disconnecting lobbies, perfect as our fittings may be. Provided, however, the lobbies are well ventilated by a cross-current of air, a projecting tower is perhaps unnecessary. I submit a small suggestion for the position of these offices which would avoid projections and, I venture to think, meet reasonable requirements in the way of disconnection.

Three separation wards are provided, a ward kitchen, patients' own clothes store, linen cupboards, &c., and a testing-room or office. There is no pantry, though one is generally provided; I believe it is as undesirable as it is unnecessary. A small tile-lined and

well-ventilated cupboard is quite sufficient for all the food, &c., which should be properly kept adjoining a sick ward.

The windows of the main block are alternately casements or French windows carried down to the floor-level, with a hopper light above, and sash windows. In mild weather it would be possible to open the casements to the full width of the window, the leaves forming screens to the heads of the beds. If heating, in addition to the central open fires, is required, small radiators might be placed immediately under the sash-windows.

The floor of the ward is raised 4 feet above the ground-level, allowing free passage for the air underneath. The ceiling is covered in the manner I have already described.

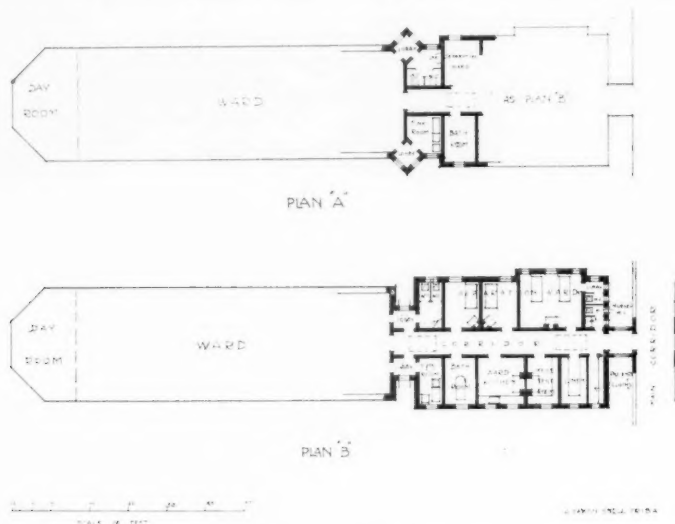


FIG. 19.—MODEL PLAN. SUGGESTION FOR ENCLOSED SANITARY OFFICES WITHOUT DETACHED TOWERS.

I have shown a closed corridor connected with each ward block by a short cross-ventilated passage. It is a concession to comfort, and questionable at that. In the great German hospitals I have shown no sheltered way is provided between the blocks.

In this necessarily short essay I have confined myself to the ward unit; but I need scarcely remind you how much interest attaches to so many other buildings which go to make up the modern hospital. An evening might be spent profitably and interestingly upon the subjects of operating theatres and out-patients' departments, to say nothing of nurses' homes, medical schools, research departments, and other minor buildings.

Even on the subject of ward units I have omitted reference to a score of important matters which affect their planning and construction; but I trust that the points I have dealt with—all too briefly—will afford material for an interesting and informative discussion.

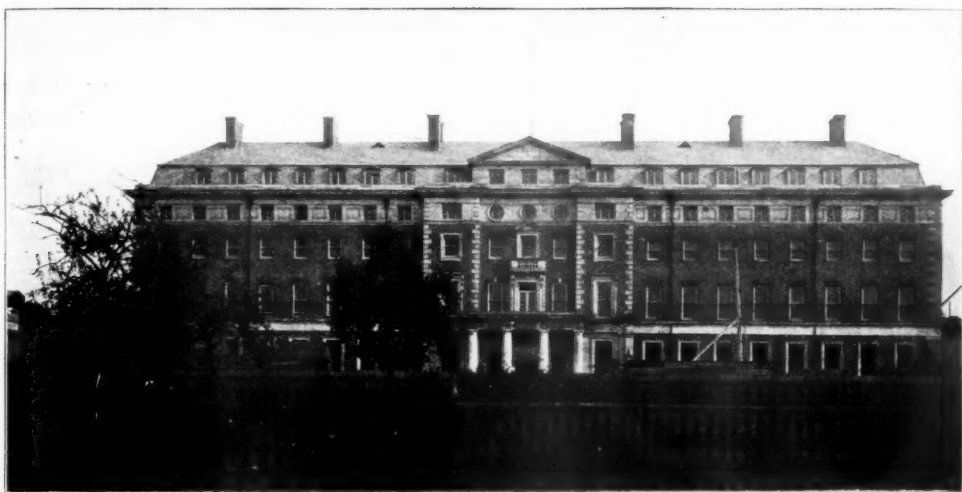


FIG. 1.—KING'S COLLEGE HOSPITAL, LONDON: ADMINISTRATION BLOCK (Architect, Mr. W. A. Pite).

A COMPARATIVE STUDY OF MODERN ENGLISH, CONTINENTAL, AND AMERICAN HOSPITAL CONSTRUCTION.

By WILLIAM MILBURN, jun., B.Sc. [A.], Saxon Snell Prizeman 1908,
Godwin Bursar 1910.

Read before the Royal Institute of British Architects, Monday, 17th February 1913.

I AM very conscious of the honour you have conferred upon me in asking me to read a Paper on the subject of modern hospitals, and, as it has been my privilege and pleasure to inspect, under your auspices, a considerable number of modern Continental and American hospitals, I propose to endeavour, in a brief survey, to describe and compare the characteristic features of the modern hospital of our own country, of the Continent, and of America, in the hope that by so doing some information or suggestions may be obtained which will be of aid in the designing and construction of these institutions, which are of vital importance to the health and well-being of the community.

When one remembers the discoveries and progress in medical science and in the treatment of the sick which have come to us from the Continent and from America, I think it is evident that a study of the design and construction of the hospitals of these countries will not only afford us considerable interest, but will offer us many suggestions and ideas for improvements in our own construction: much in the same manner as the hospitals of these countries are receiving considerable benefit by the careful study and attention which their architects and the members of their medical professions are paying to our own medical institutions.

I shall confine my attention principally to the general disposition of the buildings in relation to one another, and to the general arrangement of the wards and their annexes: it being impossible in the limits of this Paper to deal with the design of the auxiliary departments or to go into detail in matters of construction and equipment.

In order to appreciate fully the problems involved in the designing of these institutions, I propose, before treating of the actual examples, to endeavour to indicate briefly the various types of hospitals, their organisation and management, and the general principles upon which their construction is based.

THE ORGANISATION OF HOSPITALS.

The modern hospital is primarily an institution for the treatment of the sick, but, in addition, it has become a centre for medical education, clinical study, research, and investigation. Speaking broadly, there are two groups of hospitals—general and special—the distinction between the two being that a general hospital receives patients suffering from all classes of disease, whilst a special hospital is for the reception of one particular form of disease or group of diseases respectively. The foregoing definition of a general hospital, however, as to the reception of all forms of disease only applies, as a rule, to hospitals which are maintained by public funds, as those of Germany; our own general hospitals, which are supported by the voluntary system, usually excluding infectious and certain other diseases, and it is important to remember that the system by which a hospital is erected and maintained may often exert considerable influence on its design.

The modern hospital is organised and managed on scientific and business principles, and may, from the point of view of the architect, be considered as comprising two main services—medical and general—the medical services being all those departments which directly relate to the care and treatment of the patients, whilst the general services comprise such departments as the administrative, housekeeping, laundry, power, &c.

The medical services of a general hospital are divided into separate departments, so as to allow of the classification of the different diseases, there being usually two main departments—medical and surgical—and very often special departments for such diseases as ophthalmic, nose throat and ear, children, gynaecological, &c. Each department is subdivided into a number of ward units, the accommodation of each unit usually comprising one large ward, a number of small wards, and the necessary service, sanitary, and medical rooms—thus becoming, as it were, almost a complete hospital in itself. The total number of beds in each unit is determined by the nursing staff and the nature of the disease, and usually varies from twenty to thirty. Attached to and completing each department are the special rooms requisite for the particular disease, such as the operating theatres in the surgical department, and the hydro- and electro-therapeutic rooms in the medical department.

The separate departments and units throughout the institution are, as it were, self-contained and complete in themselves, yet at the same time they are all mutually dependent upon one another, and are so organised and managed as to form a complete and organic whole.

THE GENERAL PRINCIPLES OF HOSPITAL CONSTRUCTION.

When one comes to study the principles upon which hospital construction is based, one finds considerable difficulty in laying down any hard and fast rules, largely owing to the fact that the sciences upon which hospital construction depends—viz. medicine and hygiene—are, speaking generally, continually progressing by the aid of new discoveries and research, and it is impossible to say at any time that finality has been reached.

This becomes at once apparent if we consider for a moment the influence which the discoveries in the field of bacteriology have had during the last thirty to forty years on hospital construction. Prior to Pasteur's investigations and the discovery that micro-organisms are usually the causes of disease, it was the general opinion, I believe, that disease was transmitted from one person to another by a definite substance which passed through the air, and that whilst all the persons in one building were liable to be infected, persons in another building at a distance would be immune; and as this view was confirmed by the actual experience in hospitals and in times of war, the practice arose—more particularly on the Continent—of constructing hospitals of a number of small, one-story, isolated pavilions, and so doing away with large numbers of sick together. On the application by Lord Lister of Pasteur's discoveries, and the

adoption of antiseptic methods, a positive basis for the science of hospital construction was at once determined; and as the modern view appears to be that the transmission of disease in a hospital by aerial convection is rare, and that in the majority of cases it takes place by contact, and can be avoided by the adoption of aseptic precautions, we see that at the present day the principles of isolation and separation are not of such primary importance as they were in the days of hospital epidemics, and that it is no longer necessary to construct hospitals as one-story detached pavilions.

The medical requirements and the problems involved in the treatment of the different diseases must, of course, be laid down by the medical profession; but it is the province of the

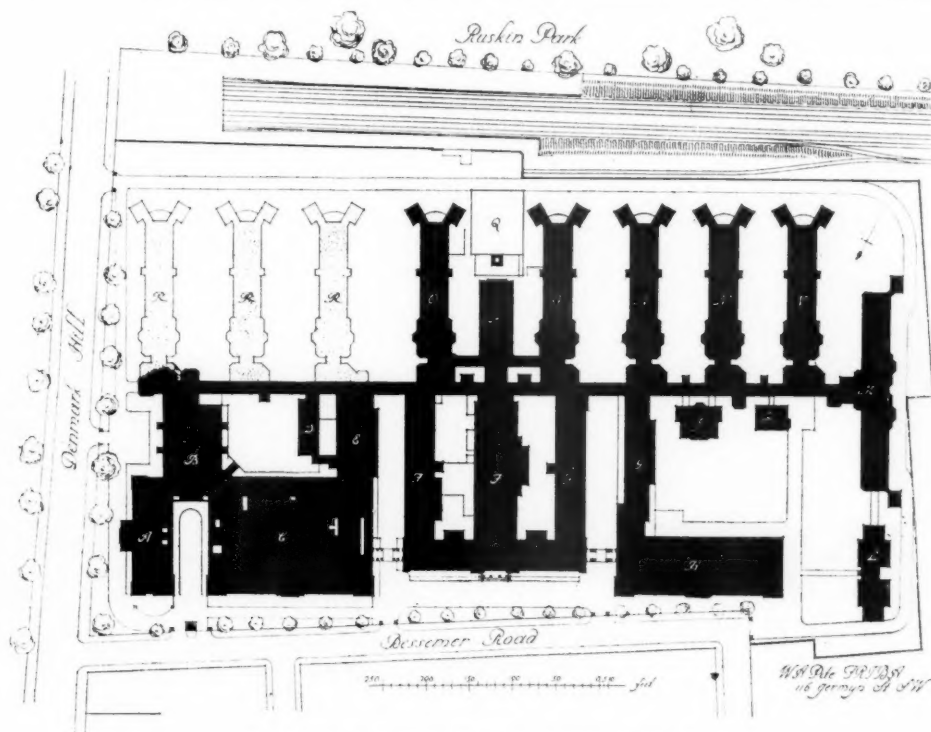


FIG. 2.—KING'S COLLEGE HOSPITAL, LONDON. BLOCK PLAN.

- | | | | |
|-------------------------------------|--|--------------------------------|-----------------------------------|
| A, Casualty Department. | F, Administration Block. | K, Gynaecological and Clinical | O, Three-Story Ward Blocks. |
| B, Baths and Electrical Department. | G, Pathological and Post-Mortem Block. | L, Theatre. | P, Chapel. |
| C, Out-Patient Department. | H, Medical School. | M, Isolation Block. | Q, Central Station. |
| D, Almoner. | J, Operation Theatres. | N, Special Ward Block. | R, Ward Blocks, future extension. |
| E, Dispensary. | | S, Two-Story Ward Blocks. | |

hospital architect so to design the buildings as to facilitate the treatment and assist in the restoration of the patient to health.

Then the requirements of hygiene in the matters of fresh air, sunlight, environment, diet, and rest, as important factors in treatment, produce requirements which greatly influence the design and construction of a hospital in such matters as the selection of the site, the orientation and arrangement of the buildings, the facilities for ventilation, &c.

In addition to the medical and hygienic requirements, the buildings must be so adapted that the various services and administrative departments can be conducted in the most efficient

and economical manner; whilst careful attention must be given to the heating and artificial lighting, sanitation, water supply, transport, and very many other things.

MODERN ENGLISH HOSPITALS.

In England the general hospitals and the majority of the special hospitals are erected and maintained by the voluntary system of contributions, whilst the Poor-Law infirmaries, the isolation hospitals, and the military and naval hospitals are erected and supported either by the municipalities or by the State.

The design and planning of the English general hospital has at the present time arrived at a definite type which, in its main outlines, is rarely departed from except in matters of detail, the system adopted being the pavilion principle of detached blocks connected together by corridors. This type may be said to have originated with the construction of the Herbert Military Hospital, Woolwich, 1860-64, and the Blackburn and East Lancashire Infirmary, 1858-65, and was further developed during the last century by such well-known examples as St. Thomas's, London, Norfolk and Norwich, Bedford County, Derby County, Birmingham General, and many others.

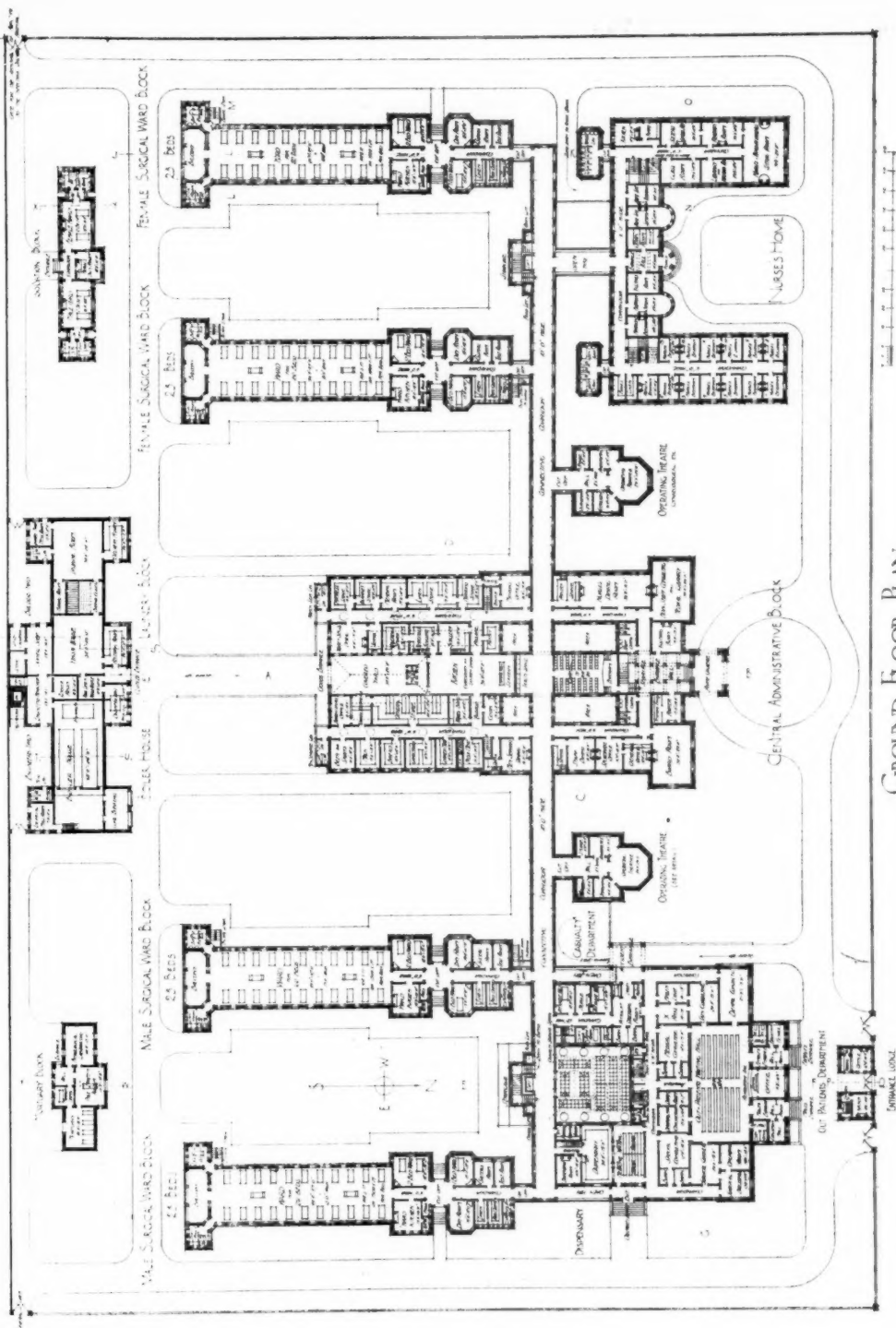
The normal plan followed is that of a central administrative block, containing the administrative and domestic departments, on either side of which and branching at right angles from a main corridor are the ward pavilions, one, two, or three stories in height, with their central axes running north and south, whilst the operating blocks, out-patients', casualty, and admission departments, and the medical school—the latter only found in clinical hospitals—are conveniently grouped in relation to the main corridor, the wards, and the entrances to the hospital. The nurses' and servants' homes are either self-contained blocks or a portion of the administrative block, whilst the laundry and power-house blocks, the mortuary block, &c., are usually detached buildings, with separate access; and a detached isolation block for septic and infectious cases is often provided.

In the majority of English hospitals the general arrangement of the rooms in the ward unit is the same, although variations in detail are found. The large ward usually contains about twenty-four beds, and at its southern extremity two disconnected sanitary towers are placed, containing the baths, lavatories, and sanitary annexes, whilst between these towers is a balcony for open-air treatment, and at the entrance end of the unit, opening from a central corridor, are the small wards and the requisite service and medical rooms.

The most recent of our general hospitals is King's College Hospital, London (figs. 1 and 2), which is to be opened shortly, and will undoubtedly rank as one of the finest and most complete hospitals in the world.

I am also venturing to illustrate a design [fig. 3], which I prepared a few years since for a general hospital for a provincial town, to accommodate two hundred beds. It was an attempt to produce a typical plan, based on a careful study of English hospital design and construction; but I may say that if at the present time I were to re-design it I should considerably modify it in some of the details.

Up to now we have been treating of hospitals situated on open or fairly open sites, but when we come to consider the sites of restricted area which only are available in the densely populated quarters of our great cities, or where the cost of land is high, it is evident that the problem of designing a hospital to comply with the hygienic requirements in the matters of aëration and ventilation to the wards is one needful of much thought. We possess, however, a number of hospitals in which these difficulties have been overcome by the application of the radial principle to the ward blocks, of which I may mention University College Hospital, London [fig. 4], the Belgrave Children's Hospital, London, and the Eastern District Hospital, Glasgow.



GROUND FLOOR PLAN

FIG. 3.—A DESIGN FOR A GENERAL HOSPITAL (Saxon Shell Prize, R.I.B.A. 1908), by William Milburn, jun., A.R.I.B.A.

The new Royal Infirmary at Glasgow [fig. 5], which is six stories high, also presents a most interesting solution of this problem. It comprises three main departments for surgical, special diseases, and medical cases respectively, disconnected from one another by open loggias. The planning of the separate departments is of particular interest, as they are so arranged that each honorary physician or surgeon, as the case may be, has the whole of his wards for males and females grouped together on one floor, with, in the surgical department, a complete operating suite. In addition, in each group are the quarters of the resident medical officer,

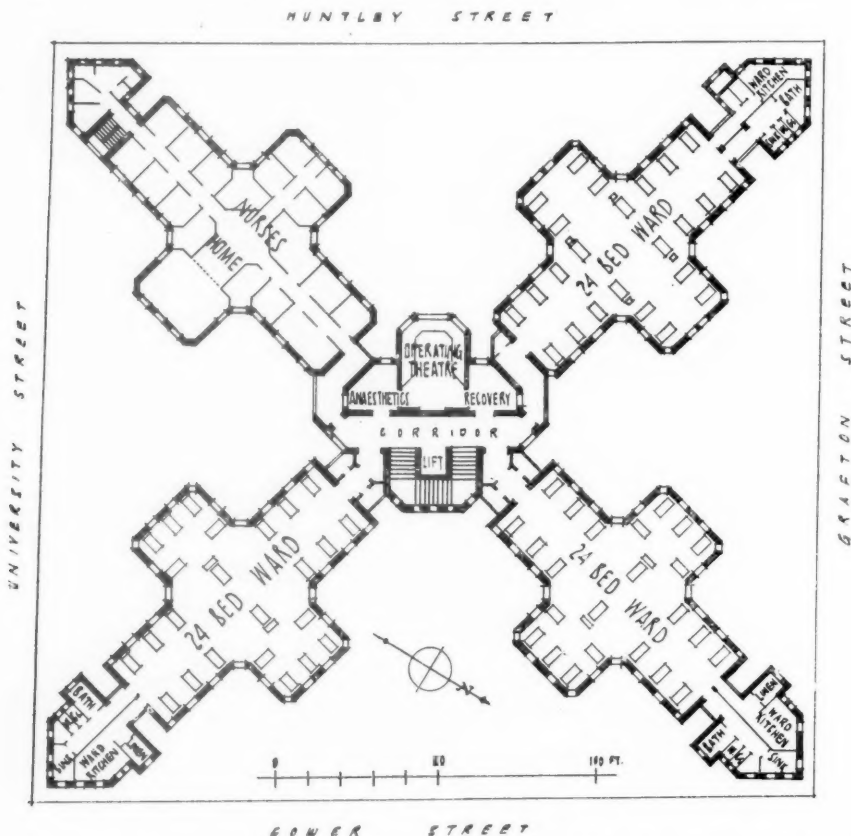


FIG. 4.—UNIVERSITY COLLEGE HOSPITAL, LONDON: FIRST FLOOR PLAN. (Architects Messrs. Alfred Waterhouse & Son.)

it being held desirable, I believe, by many administrators that the resident should reside in his unit, not only that he may be available when required at the shortest notice, but that he may be afforded facilities for research work and study which are not obtainable when he is quartered in the central administrative block.

Special hospitals are an important class, and provide accommodation only for one particular disease or group of diseases respectively, such as hospitals for children, women, ophthalmic, skin, dental, &c. They do not, as a rule, provide a very large number of beds, and are often situated on restricted sites; but in their design the same principles are followed as in general hospitals. Modern examples are the Liverpool and Sunderland Children's

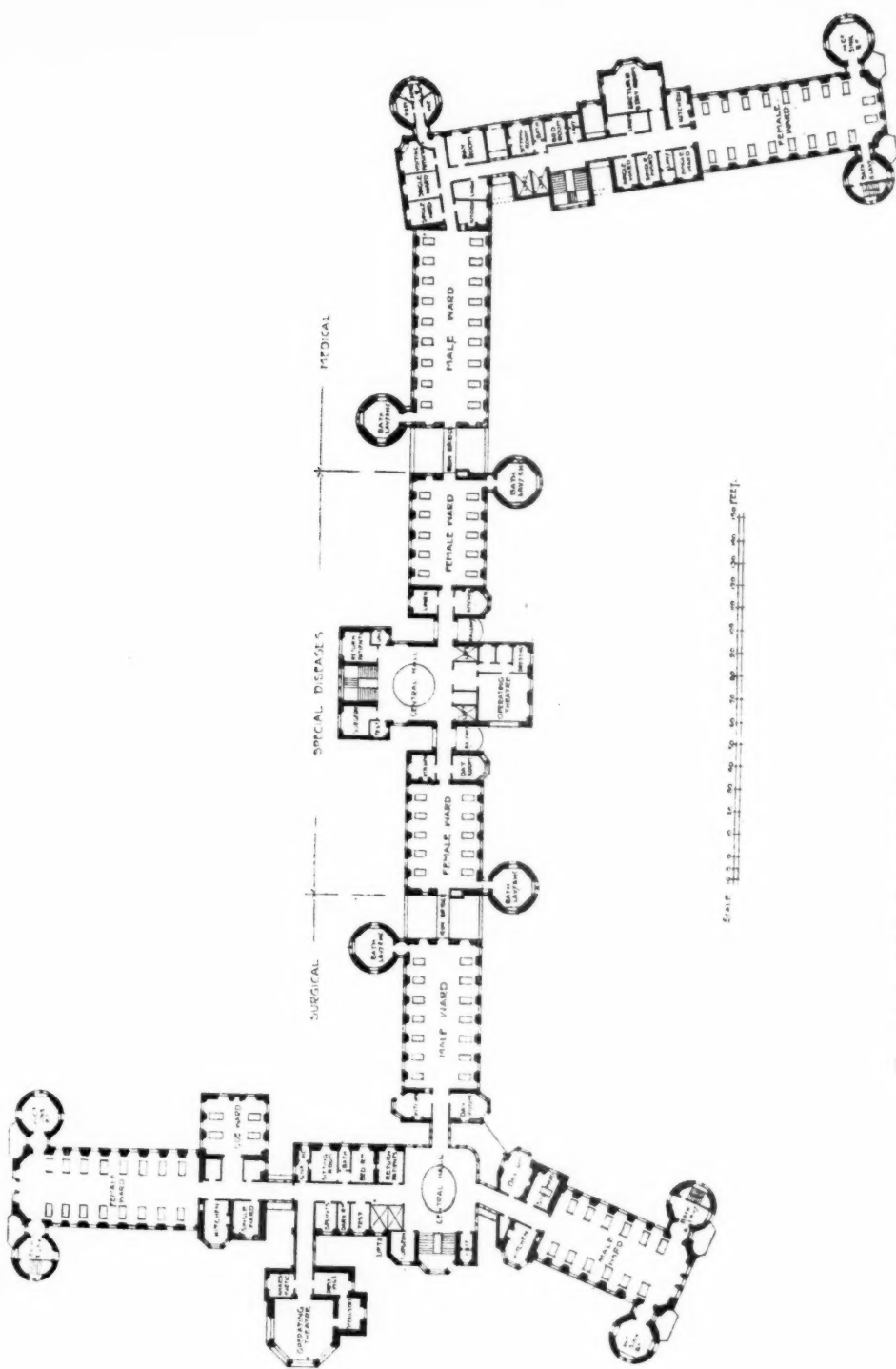


FIG. 5.—GLASGOW ROYAL INFIRMARY: FIRST FLOOR PLAN. (Architect, Mr. Jas. Miller, A.R.S.A. [F.])

Hospitals, and Glasgow and Chelsea Hospitals for Women; the latter, which I illustrate [fig. 6], is to be constructed shortly, and presents a number of most interesting features which I shall refer to later.

The Poor-Law infirmaries have in recent years greatly developed, and at the present day very many of these institutions can compare favourably in their design, construction, and equipment with many of the general hospitals erected under the voluntary system. They do not, however, provide accommodation for out-patients, nor is provision made in them for medical education. Typical modern examples are Edmonton, Leicester, Hammersmith, Willesden, Camberwell, and the Central London Sick Asylum.

The primary function of the isolation hospitals for infectious diseases is to prevent the spread of the diseases amongst the public at large, and in their design and in the adaptation of their buildings to the character of the treatment required for the different diseases they often rank among the finest of our medical institutions. At the present time very interesting developments are taking place in the design of these institutions, based on the modern medical

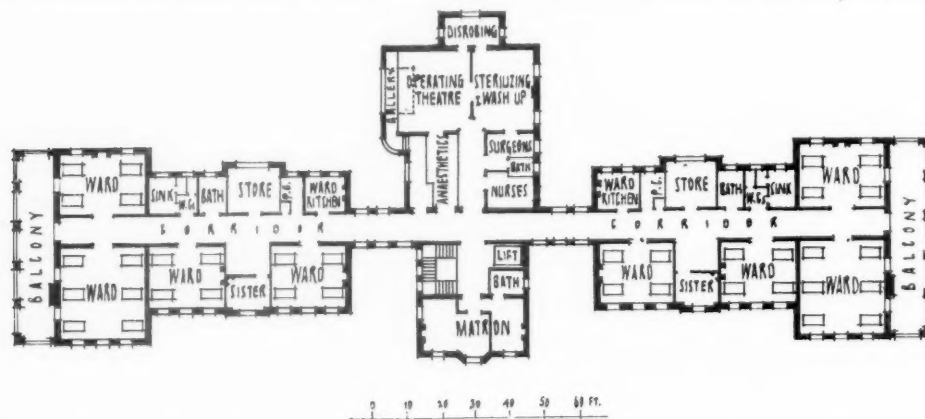


FIG. 6.—CHELSEA HOSPITAL FOR WOMEN: FIRST FLOOR PLAN. (Architects, Messrs. Young & Hall.)

opinion that infection in a hospital is usually conveyed by contact, and not by aerial convection, and the various systems in vogue, such as the "box" or "cubicle," "compartment" and "barrier," are of great interest. Among modern examples of these institutions are the Seacroft Hospital, Leeds, and the City Hospitals at Edinburgh and Liverpool.

MODERN CONTINENTAL HOSPITALS.

France.—France for a long period has presented many valuable contributions to the science of hospital construction, such as the model hospital plan prepared by the Académie des Sciences as far back as 1786—the investigations of Tenon on the subject of the rebuilding of the Hôtel-Dieu, Paris—the remarkable series of hospitals designed by Tollet, with their one-story pavilions with open basements, and the wards of ogival section—and at the present time, although a very large number of the hospitals of Paris are antiquated and quite out of date, there are a number of modern examples, such as the general hospitals Boucicaut and La Nouvelle Pitié, the children's hospitals Bretonneau and Trousseau, and the infectious diseases hospitals Les Enfants Malades, Claude Bernard, and the Pasteur, of very great interest.

The most recent Parisian general hospital, La Nouvelle Pitié [fig. 7], opened recently

with accommodation for about 1,000 patients, ranks among the great modern hospitals of the world. The site is some 15 acres in extent, and of a most irregular shape, but the difficulties have been solved in a most interesting manner. The pavilions generally are of three stories of wards, the maximum number of beds per ward being twenty; and the whole of the buildings are connected together by a large subway—a characteristic feature of the Parisian hospitals—for food, linen, mortuary, and general services, but not for patients.

The design of the two pavilions of the hospital attached to the Pasteur Institute at Paris is of great interest, as in this institution it has been fully demonstrated that it is possible to treat patients suffering from different infectious diseases in the same building with practically no risk of cross-infection. The pavilions are of identical design and of two stories of wards, each floor, as will be seen from the accompanying plan [fig. 8], comprising twelve separate isolation rooms or "boxes," each for one bed; four three-bed convalescent wards, each for a different disease; the service rooms, and special receiving and discharge rooms. The upper portion of the walls of the "boxes" are glazed, the lower portion being of lava slabs, whilst the

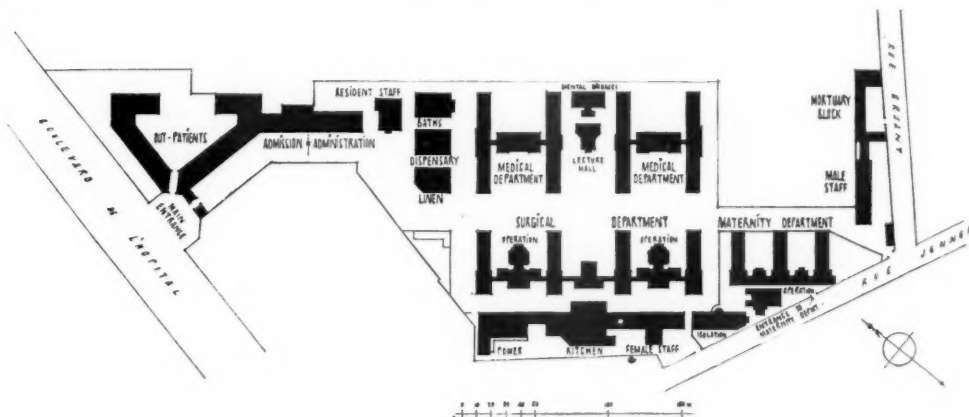


FIG. 7.—LA NOUVELLE PITIÉ HOSPITAL, PARIS: BLOCK PLAN. (Architect, M. W. Rochet.)

floors are of tiles. In normal cases the service is conducted from the central corridor, but in exceptional cases, such as plague, a "box" can be entirely isolated from the building, and the service is performed from the outside balcony, which is also utilised for the access of patients' friends in normal cases. The nursing and service is carried out on the most rigorous aseptic principles, special overalls being provided for the nurse and doctor in each "box," and provision for disinfection and sterilisation is made everywhere.

Belgium.—At the present time a very large hospital is being constructed by the City of Brussels at Jette-Saint-Pierre, some three to four miles from the city, and in connection with this scheme a most valuable work on hospital design and construction, entitled *La Construction des Hôpitaux*, has been produced by Drs. Depage, Vandervelde, and Cheval, three of the leading Brussels physicians. The type of hospital which they favour consists of one-story, detached ward pavilions, connected together by open terraces, to form the departments for the different diseases. Their model unit [fig. 9] comprises thirty beds, contained in two twelve-bed wards and six isolation wards, one of the large wards being intended for acute cases, and the other for convalescents. The service rooms are centrally situated, and large terraces and verandahs are provided, whilst every effort has been made to avoid corridors, all the rooms opening from a large entrance-hall.

Holland.—One of the best of the modern Dutch hospitals is the University Hospital at Utrecht, opened in 1908, for surgical, maternity, and gynaecological cases, with accommodation for about 170 beds. The plan [fig. 10] shows a combination of the corridor and pavilion systems, the one building, which is generally of two stories, containing the whole of the administrative rooms, wards, lecture theatres, out-patient departments, kitchen, and service rooms, nurses' home, &c. The majority of the large wards contain twelve beds, and are lighted from three sides, whilst the bath and sanitary rooms are at the entrance end of the unit opening from the corridor.

There are a number of other interesting modern hospitals in Holland, such as the University Hospital at Groningen, and some of the Amsterdam hospitals, whilst the greatest attention is paid by the authorities to the subject of hospital construction.

Germany.—In Germany the great majority of the hospitals are provided and maintained by public funds, the general hospitals which admit all forms of disease being erected, equipped, and maintained by the municipalities, whilst the University hospitals, which are the centres of medical education and research, are similarly provided and maintained by the State. The great attention given and the scientific methods adopted in the design, construction, and equipment of these institutions, so as to adapt the buildings to the medical and hygienic requirements, renders a study of them of the greatest value and interest. The insurance scheme in vogue in Germany has also had considerable influence on the development of the modern hospital, accommodation for four classes of patients being usually provided.

The greatest care is taken in selecting the sites, which are usually most excellent in all respects, being generally in the suburbs or adjoining large open spaces, whilst the attention given to the lay-out of the grounds is most remarkable. The University hospitals, which, unlike the general hospitals, admit out-patients, are for this reason, and also for the convenience of the staff and students, more often near the centre or close to the centres of the cities than are the general hospitals.

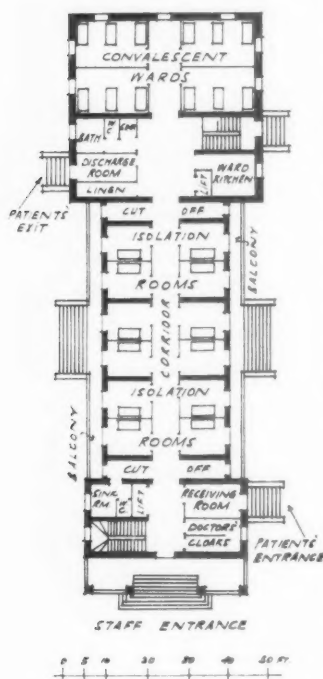


FIG. 8.—PASTEUR HOSPITAL, PARIS:
GROUND FLOOR PLAN. (Architect,
M. F. Martin.)

The small and medium-size general hospitals, with an accommodation up to two or three hundred beds, as a rule, comprise a main building, containing the whole of the accommodation for the non-infectious cases and the administrative and domestic departments, whilst additional blocks are provided for the infectious cases, the technical services, and the pathological department respectively. The Municipal Hospital at Offenbach may be taken as a typical example, the plan of the main building [fig. 11], as will be seen, consisting of a combination of the corridor and pavilion systems.

The large municipal hospitals, which in some cases provide accommodation for as many as 2,000 beds, consist of separate buildings, arranged primarily in three main groups—the first group comprising the buildings for the general sick, the second group the infectious diseases buildings, and the third the general services and technical blocks, such as the kitchen, boiler-house, &c.—whilst common to all three groups are the administrative and pathological blocks. The blocks for patients are again sub-divided into two main departments for medical

and surgical cases, with their baths and operation blocks respectively attached, whilst separate blocks are provided for the special diseases. The Rudolf Virchow Hospital, Berlin [JOURNAL R.I.B.A., 25th Nov. 1911, p. 37], opened in 1906, on a site of 63 acres, with accommodation for 2,000 patients, is a typical example of this grouping and arrangement of departments, and is well worthy of the closest study.

The typical German hospital of some twenty or thirty years ago, such as the Moabit, Berlin, or Hamburg Eppendorf, which, based on the lessons derived from the great wars of 1870 and on antiseptic principles, consisted of a very large number of one-story isolated pavilions—the pure pavilion system—is now largely superseded; and in very many of the modern hospitals the separate blocks are linked up to one another by closed corridors, and the pavilions are of two or three stories of wards. As a rule, however, pavilions for infectious diseases are isolated blocks of one story, each for a separate disease; but where the site does not admit of this arrangement there is no hesitation in erecting them of two or three stories, and arranging departments for different diseases, each with a separate entrance, in the one block.

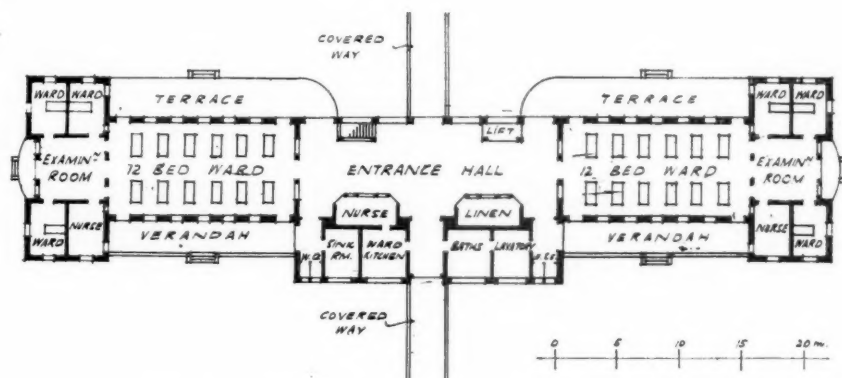


FIG. 9.—DESIGN FOR A WARD UNIT BY DRS. DEPAGE, VANDERVELDE, AND CHEVAL, BRUSSELS.

Owing to the very varied requirements of the different localities, there are no fixed types for the German hospitals, but Charlottenburg West End,* Rixdorf [fig. 12], Cologne Lindenberg,† Karlsruhe [fig. 13], and Munich III. [fig. 14] may be cited as typical examples of the general arrangement of the buildings in the modern German general hospital.

The ward units, again, are of very differing types, a striking feature, however, always being the proportion of the annexes to the large ward, the former very often exceeding the latter in area. The large wards, as a rule, do not contain more than twenty beds, fourteen to sixteen being the usual number, whilst the tendency is towards the ward with twelve beds and even less, and a very large proportion of small wards is provided. Another feature is the non-disconnection and the large amount of space allotted to the sanitary annexes. Typical examples of a ward unit attached to a connecting corridor are Cologne Lindenberg [fig. 15] and Mülhausen-i.-Els., whilst Karlsruhe [fig. 16] shows the complete department on the corridor pavilion system, and Munich III. [fig. 17] is a remarkable example on the corridor system with a large number of small wards in the unit.

The University hospitals more often comprise separate blocks or clinics, each of which becomes, as it were, a complete hospital for its own particular disease, with its patients' accom-

* JOURNAL R.I.B.A., 25th November 1911, p. 39.

† Ibid. p. 40.

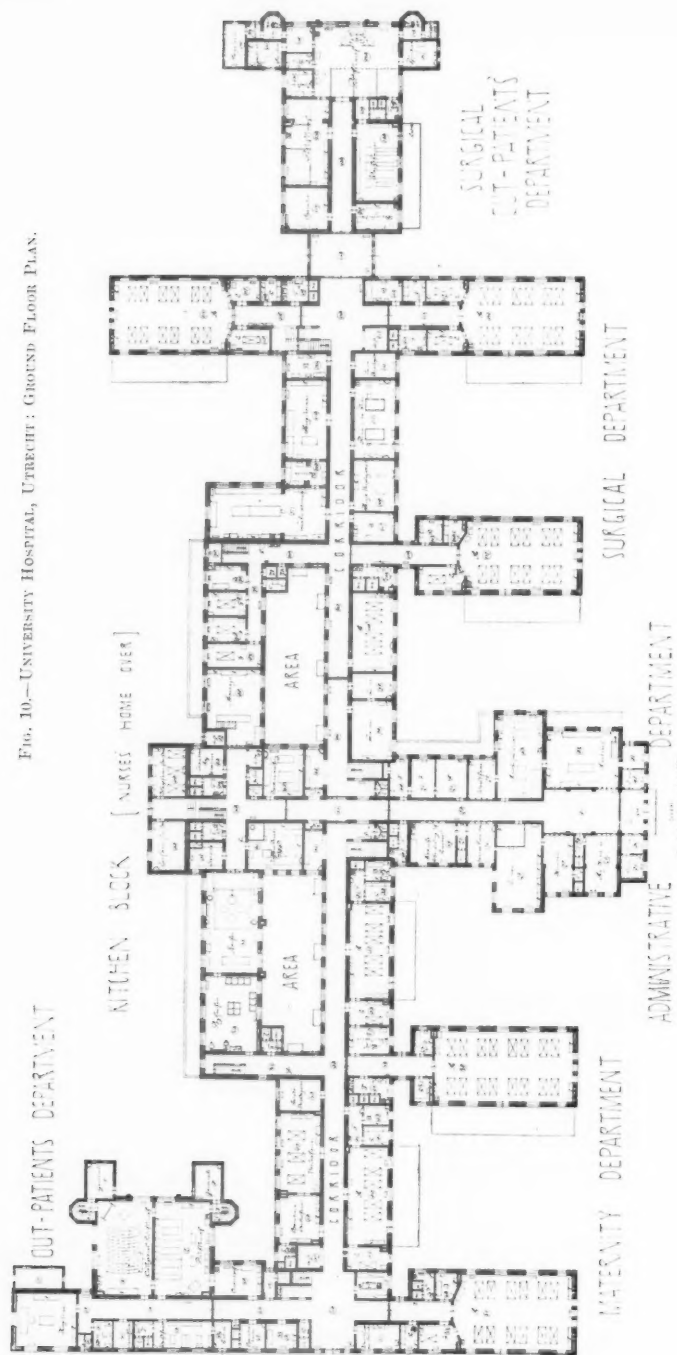


FIG. 10.—UNIVERSITY HOSPITAL, UTRECHT: GROUND FLOOR PLAN.

modation, laboratories, lecture theatres, professors' rooms, &c.; whilst common administrative, domestic, technical, and pathological blocks are provided. One of the finest examples in Germany is the Royal Charité Hospital at Berlin.

Other European Countries.—I have not visited Vienna, but I understand that, whilst among the very large number of hospitals which the city possesses there are none of outstanding merit, yet some of the modern additions are of very great value and interest, such as the new surgical pavilion of the Rudolfiner Haus.

At Copenhagen, I believe, there is a very large hospital in construction at the present time, the pavilions being planned on the corridor system, with all wards facing south, and I understand that the King Humbert "Policlinico" at Rome is another most interesting modern hospital.

MODERN AMERICAN HOSPITALS.

In the United States of America the general hospitals, which admit all classes of disease, with the exception of infectious cases—as the Belle Vue Hospital, New York—and the special hospitals for contagious diseases

are provided by the municipalities; whilst many of the religious bodies and charitable associations provide general hospitals—such as the Presbyterian or the St. Luke's Hospitals, New York—and special hospitals for children, ophthalmic, &c., diseases.

The general impression which one receives from an inspection of many of the American hospitals erected during the last ten to fifteen years is that, whilst as buildings the majority are excellent, a very large number are considerably lacking in many of the essential requirements and details necessary to a hospital, from the medical and hygienic points of view. However, at the present time the youth and wealth of the country, the immense population, the rapidly growing cities, and the demands of medical education are necessitating the erection of new hospitals; and, as the greatest attention is being devoted by the authorities to the

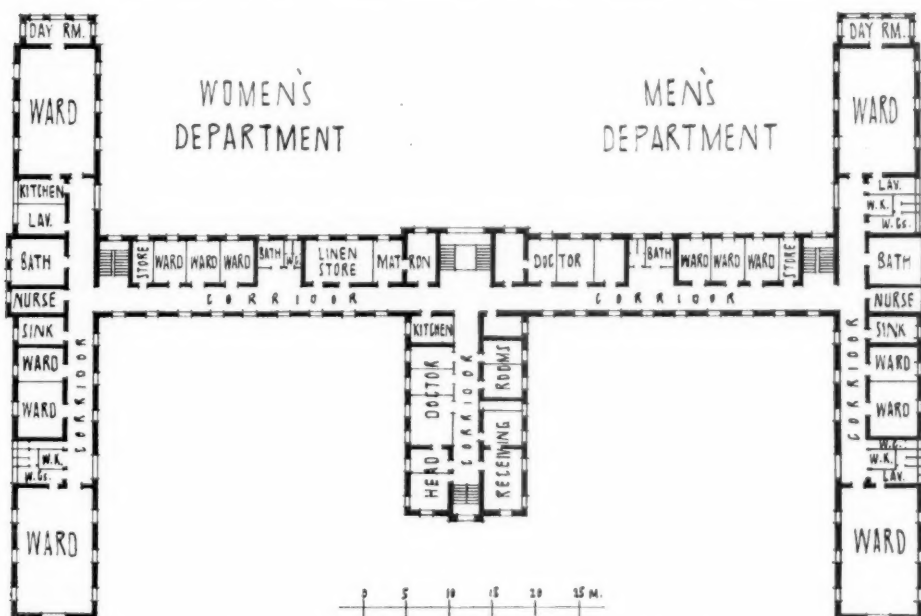


FIG. 11.—OFFENBACH MUNICIPAL HOSPITAL: FIRST FLOOR PLAN.

subject of hospital design and construction, there are a number of hospitals recently erected and others in course of construction which represent a great advance on the majority of the existing institutions, and in all respects are well up to, and in some points excel, the leading hospitals of Europe.

The Johns Hopkins Hospital, Baltimore [see plan, p. 272], opened in 1889, is still one of the best hospitals in the United States, and one of the most celebrated pavilion hospitals in the world. As originally designed the majority of the pavilions were of one story, connected to one another by open terraces, whilst a closed corridor at the basement-level of the pavilions and the ground-floor level of the administrative block connected the whole of the buildings together. The five pavilions to the south were, however, never constructed, and the site intended for them has been occupied recently by two most interesting buildings—the Phipps Psychiatric Clinic and the Harriet Lane Children's Hospital—each of five stories and of the corridor type of plan, a great contrast to the one-story pavilions as originally designed, and one which shows the changing methods of hospital construction. Additional buildings have

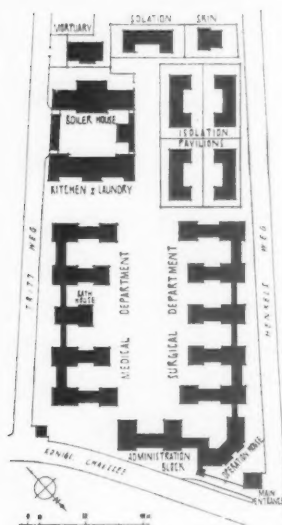


FIG. 12.—RINDORF MUNICIPAL HOSPITAL: BLOCK PLAN.

Other modern pavilion hospitals possessing considerable interest are Freedmen's Hospital and the Naval Hospital at Washington; the Peter Bent Brigham Hospital, and portions of the other Boston hospitals; Bay View Hospital, Baltimore, and the hospitals on Blackwells Island, New York City; and the contagious diseases hospitals at Philadelphia and Providence.

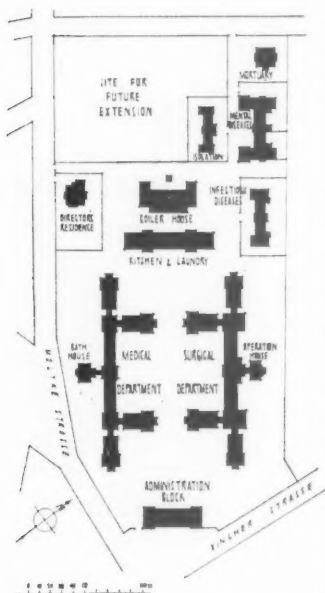


FIG. 13.—KARLSRUHE MUNICIPAL HOSPITAL: BLOCK PLAN.

also been erected upon the site, such as a pavilion for negroes, a tuberculosis dispensary, &c., whilst the original isolation pavilion is now utilised as a maternity department, and a number of other alterations have been made.

At Cincinnati the new general hospital [fig. 18], now approaching completion, the design of which is largely due to Dr. Christian R. Holmes, will undoubtedly rank as one of the great pavilion hospitals of the world. The site is some 27 acres in extent, situated on an elevated plateau in one of the suburbs, and when complete the hospital will accommodate 1,400 beds. The details of many of the buildings are most interesting, and, in particular, the receiving ward in its relation to the rest of the hospital and its internal design. One side of the hospital is for males, and the other for females; and the pavilions generally are of three stories of wards, with a very complete roof-ward on the fourth floor, whilst a corridor at the lower ground-floor level connects all portions of the hospital for all purposes. The typical ward unit [fig. 19] is well worthy of careful study, the large ward containing twenty-four beds, and the details of the annexes, or "head house" as they are called in America, are most complete.

One of the outstanding features of the American hospitals, and one which renders the problems to be solved of considerable difficulty, is the fact that, in the great cities such as New York, Chicago, or Philadelphia, owing to the congestion and the high prices of land, the sites obtainable are of the most restricted character, necessitating the erection of high hospital buildings. There is, however, a very general feeling that it is only necessary to erect high hospitals when it is impossible to obtain adequate sites, and efforts are always made to do so; but there is also a general feeling against spreading the buildings out to an unnecessary extent, and so needlessly increasing the cost of upkeep in such matters as administration, service, heating, lighting, and cleaning.

Of the high hospitals on restricted sites there are a number of examples in many of the great cities; but it is only in a few recently erected or now in course of construction that the medical and hygienic problems can be said to have been satisfactorily solved.

The New York Hospital [fig. 20], now in course of construction, is situated on a site typical of New York City, it being some 800 feet long by 200 feet wide, and about four acres in extent; but, as it adjoins the Hudson River and fronts on to a small park, it obtains the benefit of a considerable zone of aëration. The hospital will ultimately provide accommo-

dation for about 600 beds, and there will be eight independent buildings, connected together by bridges, the majority being of five stories, whilst the two central ward blocks will be of seven stories. The large wards will contain twenty beds each, and the ward unit plan will be based on the T-shaped ward plan [fig. 21], introduced by Dr. S. S. Goldwater, Superintendent of the Mount Sinai Hospital, New York, who is consulting superintendent for the new buildings; it being claimed for this plan that it possesses certain advantages over the normal plan, and is necessary to adapt the pavilion type to the requirements of the restricted site.

Two interesting modern high hospitals are the Western Pennsylvania Hospital, Pittsburg, and the Good Samaritan Hospital, Cincinnati, designed somewhat on the lines of University College Hospital, London, with ward buildings radiating from a centre, a type which is peculiarly appropriate to the restricted sites obtainable.

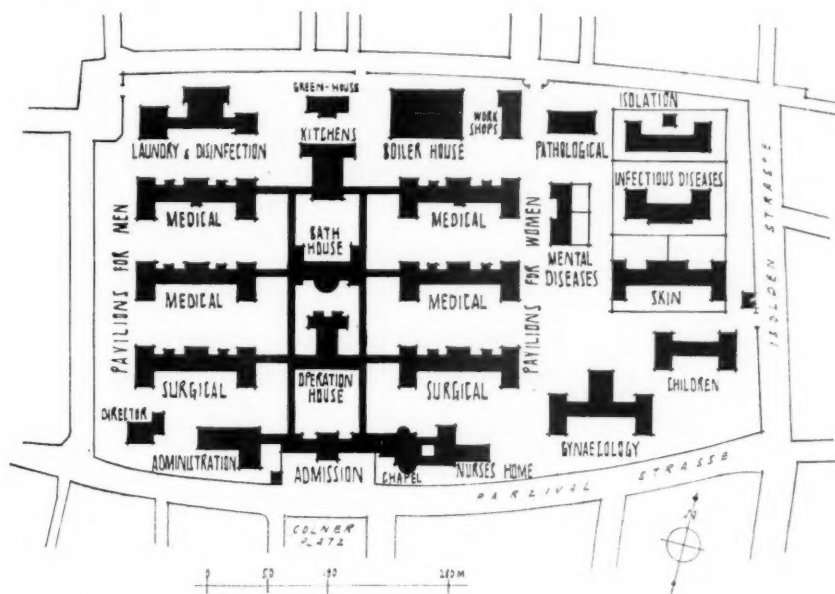


FIG. 14.—THE THIRD HOSPITAL, MUNICH: BLOCK PLAN. (Architect, Herr R. Schachner.)

The rebuilding of the Cook County Hospital at Chicago, now in course of construction, as a ten-story building, on the corridor type of plan, with projecting pavilion blocks, is a remarkable example of the multi-storied hospital, and some high hospital buildings now in course of construction at Detroit present many interesting features.

Canada possesses a number of interesting hospitals, notably the new general hospital at Toronto, in which the medical and surgical departments are planned on the group system, somewhat on the lines of the Glasgow hospitals, and I understand that Mexico also possesses some modern hospitals.

The large wards of the American hospitals usually contain about twenty-four beds, but in Chicago Dr. Ochsner strongly favours the six-bed ward as the maximum. The charge-nurse almost invariably has a desk in the large ward, at which she sits, and very elaborate systems of signal and call bells are provided. Of particular excellence are the luxurious pavilions for private patients and the nurses' homes, which in many cases remind one of first-class hotels. Many of the medical schools, as Harvard and Pennsylvania, possess admirable modern

buildings, and particular attention is now being given to the provision of buildings for the treatment and study of mental diseases. The ambulance services are particularly efficient.

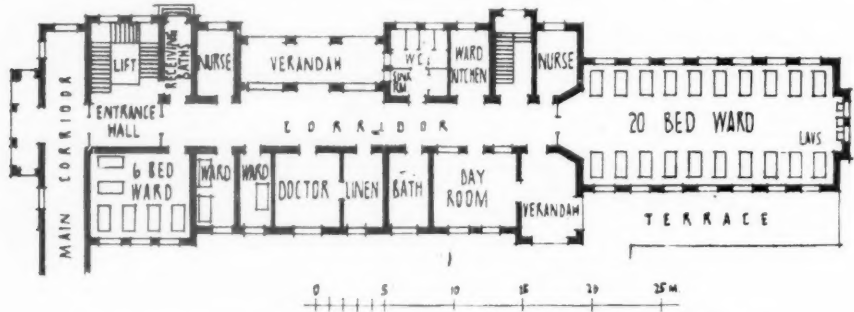


FIG. 15.—THE LINDENBERG HOSPITAL, COLOGNE: WARD UNIT. (Architect, Herr Kleefisch.)

and other details of interest are the excellent elevator services, and the incinerators or small destructors in each ward kitchen, in which all refuse is destroyed locally. Particular mention

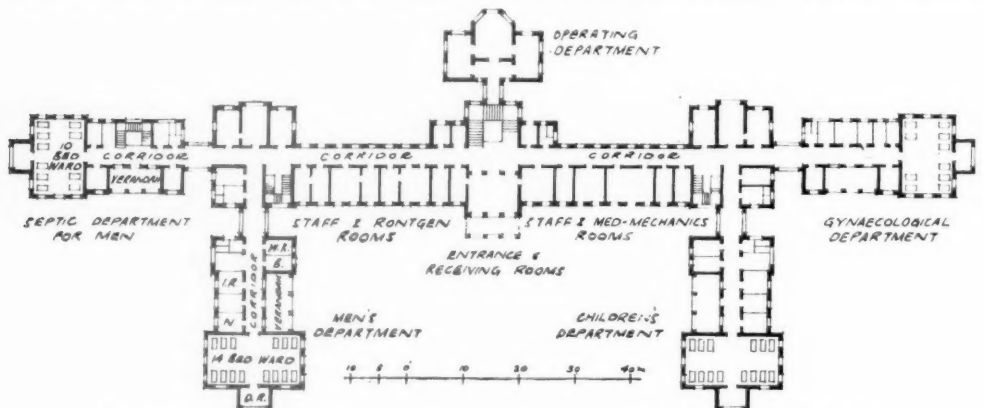


FIG. 16.—KARLSRUHE MUNICIPAL HOSPITAL: GROUND FLOOR PLAN OF THE SURGICAL DEPARTMENT

should be made of the very complete roof-wards and gardens, and the great provision of verandahs and balconies for outdoor treatment.

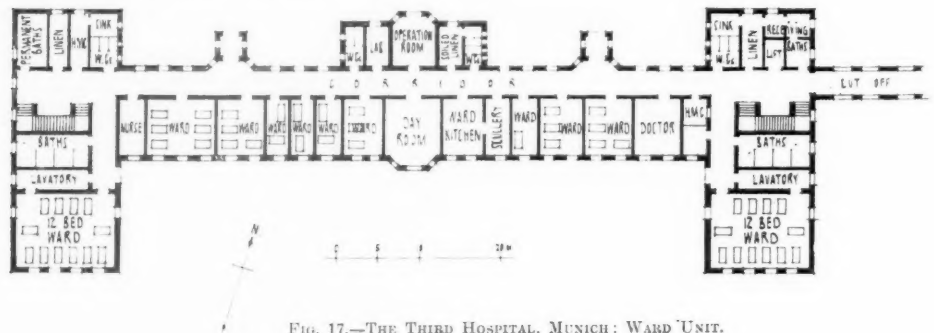


FIG. 17.—THE THIRD HOSPITAL, MUNICH: WARD UNIT.

Apart from the excellent materials and workmanship, and the highly imposing façades of many of the hospitals, there are not many constructional details of very great interest. The ward floors are usually of pitch-pine, with linoleum walking inlays, although the Cincinnati floors are of tiles. The sanitary annexes in their arrangement are often poor, the whole of the baths and sanitary apparatus being placed in one room and separated by partitions. Heating is central, the radiators in the wards being heated either by steam or hot water. A point of interest is that at the present time, although the majority of the hospitals in New York City

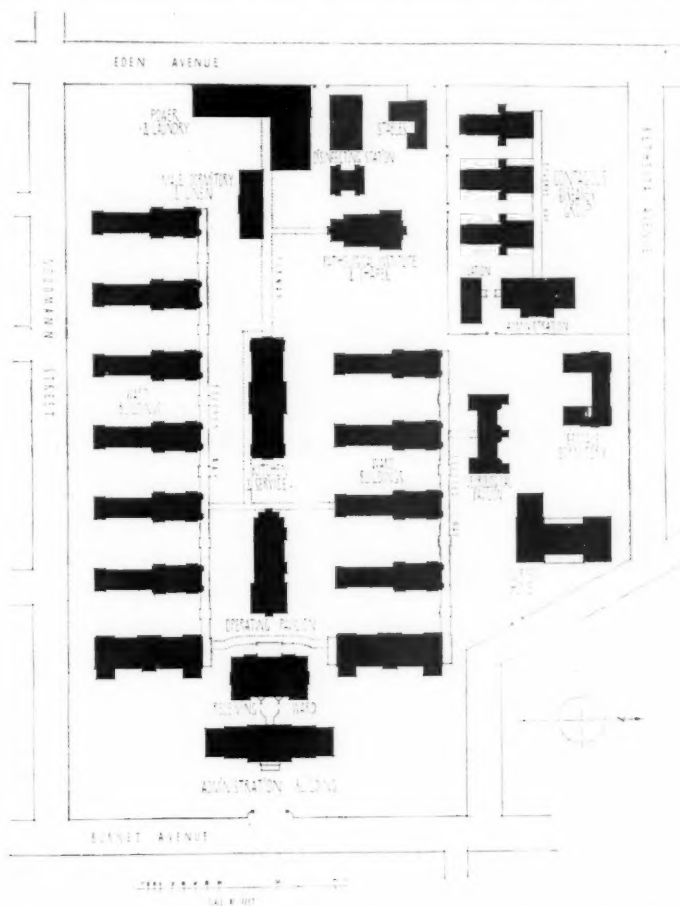


FIG. 18.—CINCINNATI GENERAL HOSPITAL: BLOCK PLAN. (Architects, Messrs. S. Hannaford & Sons.)

have provision for mechanical ventilation, none of them are utilising it to any great extent for their wards. Lighting is usually by electricity, upward reflectors being employed in the wards.

SOME CONCLUSIONS SUGGESTED BY A COMPARATIVE STUDY OF MODERN ENGLISH, CONTINENTAL, AND AMERICAN HOSPITAL CONSTRUCTION.

Having now attempted to outline briefly the characteristic features of the modern hospital of our own country, the Continent, and America, I propose to mention a few deductions

R R

and conclusions which are suggested by a comparative study of the institutions of these countries. One must, of course, remember that, whilst considerable influence is exerted on the design by different localities and climates, the varying systems of maintenance and support, and the varying requirements of medical education, the central purpose of a hospital—the treatment of the sick—remains the same, no matter in whatever country or climate it may be situated.

When one compares the great pavilion hospitals of Germany and other countries with the majority of our own institutions, one is at once struck by the much greater size of the institutions of the former countries; by the entire disassociation of the kitchen and all service blocks from the administrative and patients' buildings; by the grouping of the patients' buildings into definite departments in accordance with the diseases; the reduction in the accommodation of the large ward, the number of special rooms in the ward unit, and the non-disconnection of the sanitary annexes; the much greater provision for special treatment in hydro-, electro-, and mechano-

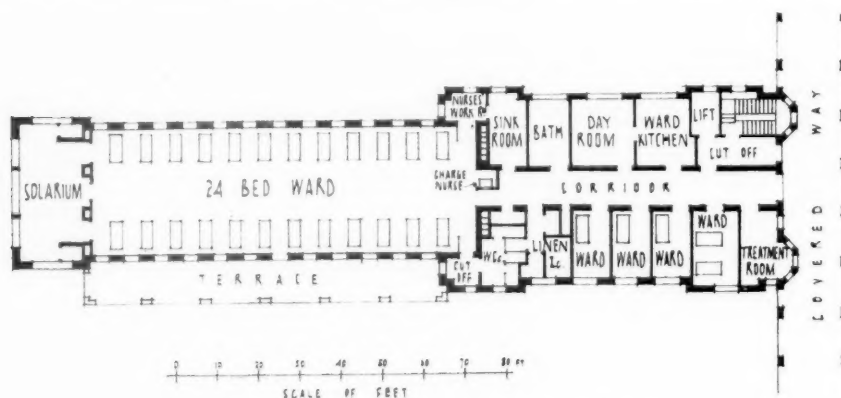


FIG. 19.—CINCINNATI GENERAL HOSPITAL: WARD UNIT PLAN.

therapeutics; the greater provision for scientific work, research, investigation, and pathology; the provision of balconies and roof-wards for outdoor treatment; the excellent sites, and the remarkable laying-out of the gardens and grounds.

It will be perceived that it is mainly the medical requirements and considerations which cause the majority of the differences in the grouping and planning of the buildings in the hospitals of other countries, in comparison with our own institutions; for there can be no question that, from the points of view of hygiene, sanitation, and construction, our hospitals are well up to, and very often excel, those of other countries. It thus really becomes more a question for the medical, rather than the architectural profession, to tell us whether, say, the typical German general hospital is or is not superior in its general arrangement and accommodation to our typical institution. Certainly the majority of foreign authorities and critics appear to consider that our typical general hospital, whilst possessing very many excellent points, is inclined to be somewhat stereotyped in its general arrangement and in the planning of the ward unit; but, on the other hand, there is a general opinion among foreign experts that our out-patient departments and our fever hospitals are superior to the majority of similar buildings in their own countries; and there can be very little question that we often excel in the internal design of our large wards, such as the relation of the beds to the windows, the floor and cubic space, &c.

As to the size of hospitals, I may say that there is a very general feeling in Germany that the total accommodation of one institution should not exceed 1,500 beds.

As to the disassociation of the kitchen and all service blocks from the administrative and patients' buildings, this is largely a question which depends on the size of the institution; for it is only, as a rule, in the larger Continental hospitals of four hundred beds and upwards that this arrangement is found.

As to the grouping of the patients' accommodation into separate departments for medical, surgical, and special diseases, which is invariably such a well-marked feature of the Continental institutions, I am of opinion that the system of organisation and management has considerable influence; but we, of course, possess in the new Manchester and Glasgow Royal Infirmaries, and in others of our institutions, some excellent examples of this grouping.

Then as to the height of hospital buildings, American and our own institutions show that

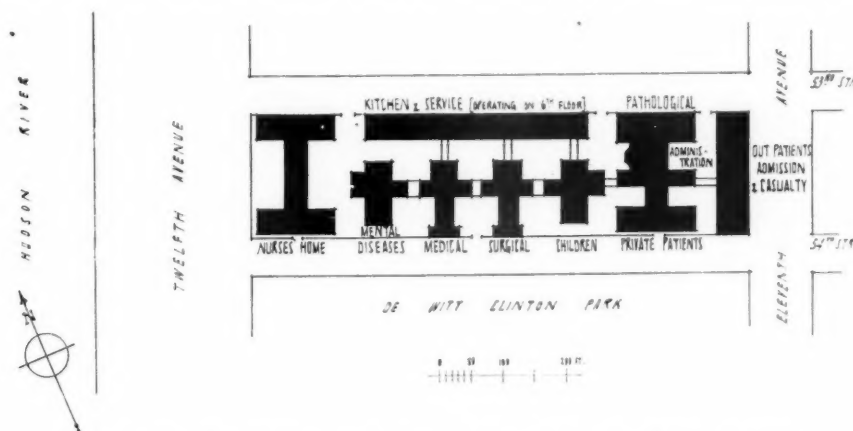


FIG. 20.—NEW YORK HOSPITAL: BLOCK PLAN. (Messrs. McKim, Mead & White, Architects.)

there is no objection to this type of construction in itself, but it appears to be generally agreed that the high hospital is only necessary where it is impossible to obtain other than a restricted site.

With regard to the differences that occur between the planning of our own and the Continental and American ward units, the tendency to decrease the size of the large ward, and to increase the size of the annexes, by providing a larger number of small wards for the purpose of classifying the individual patients and diseases both in the interests of the patients and of science, and also the provision of a greater number of rooms for special medical and service requirements, is one due almost entirely, I believe, to medical considerations. The ideal, I believe, which, however, from practical considerations is impossible, is a separate ward and nurse for each acute case; but we, too, are showing the tendency to decrease the accommodation of our large wards in such examples as Belfast Royal, Glasgow Royal, and Manchester Royal.

One point, however, in which our typical ward unit plans differ essentially from those of other countries is in the disconnection and planning of the sanitary annexes. One of the best-known American hospital authorities remarked to me that he considered our disconnecting lobbies were relics of the old earth-closet days; but, whilst there are undoubtedly certain points in favour of the disconnection of the sanitary annexes, I venture to think that at the

present day our typical ward unit plan with its twin sanitary towers at the south end of the large ward is one which can be modified with considerable advantage. In the first place, these projecting towers are usually so placed that they must deprive the large ward of a considerable amount of sunshine and air; secondly, for service considerations it is more desirable that these annexes be so situated that they can be utilised with equal facility from both the large and the small wards; and, thirdly, I do not know of any hygienic objection to the non-disconnection of the baths and lavatory, and if the sink-room and water-closets are well placed and properly ventilated, I am of opinion that there is very little objection to their non-disconnection, whilst,

on the other hand, there are very considerable advantages to be derived therefrom. This is a point to which I have always paid close attention in my examination of foreign hospitals, because with us, until recently, the disconnection of the sanitary annexes has been considered somewhat in the nature of an axiom; and I may say that whilst in Germany, as a rule, I have never noticed any objection to their non-disconnection, on the other hand in some hospitals in other countries where these rooms were badly placed there were many grave objections.

At the present time, however, we are inclined in our construction to depart from accepted types, which is well seen in the recent additions to Glasgow Western Infirmary, where the bath-room is brought into the main building; in the selected design in the recent competition for Bradford Royal Infirmary, where, in addition to the bath-room being brought into the main building, the sanitary tower containing the water-closets and sink-room is placed at the entrance end of the large ward; and, finally, in the design for the Chelsea

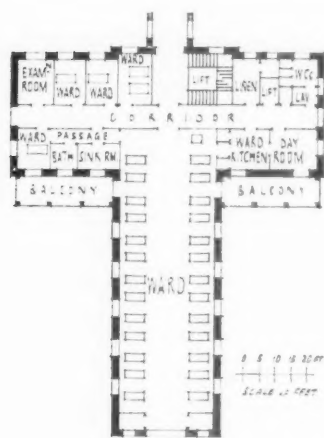


FIG. 21.—DESIGN FOR A WARD UNIT BY
DR. S. S. GOLDWATER, NEW YORK.

Hospital for Women, where none of the sanitary annexes are disconnected.

This last is such a remarkable example for an English hospital that I recently wrote to Mr. Keith D. Young, the architect of the hospital, asking him for his opinion on this question, and he has very courteously permitted me to quote the following extract from his reply:—

" . . . I have gradually been coming to the conclusion that the disconnecting lobby is not a necessity. In the old days when sanitary plumbing was a lost art, or, rather, had not been developed, and fittings and connections and everything else were all of the crudest description, it no doubt was necessary to interpose a ventilated lobby between the sanitary offices and the ward; but now, with the almost perfection that sanitary work has got to, I see no real necessity for it. Moreover, you will find that wherever the lobby is provided the nurses invariably fix the doors open, and so render it of no effect. The practice has never been adopted in Continental hospitals to any extent, while in American hospitals, so far as I know, they depend very much upon their ventilation arrangements to prevent air passing from the sanitary offices to the wards. This, personally, I do not believe in a bit. I would not of course enter the sanitary offices direct from the wards, but it would be an immense help in planning if we could get rid of the projecting towers. Another point that I should like to make, although no doubt it has occurred to you, and that is putting the bath-rooms out in a projecting sanitary tower with a cross-ventilated lobby is nothing else than a blunder. A bath-room is not, of course, a sanitary office in the same way that a water-closet or a sink-room is, and the ventilated lobby may be a positive danger to a patient passing through it after having had his bath. In children's wards or children's hospitals I always arrange, if possible, that the bath-room shall be entered direct from the ward."

This opinion, coming from such an authority as Mr. Young, carries the greatest weight; and, as Mr. Young says, the abolition of the projecting towers would undoubtedly free us from restrictions in our planning, and give us much more freedom in our design. This is a question

which I think is well worthy of the most careful consideration and discussion by our hospital architects and authorities.

As to the greater provision in some of the Continental hospitals of rooms for special treatment and for educational and pathological work, this is, I think, purely a medical question, but Continental examples certainly afford us many valuable suggestions. Again, if in the future we have to build special pavilions for private patients, as seems probable, there are many suggestions to be obtained from Continental and American institutions.

There are numerous other suggestions in design, construction, heating, and ventilation, which one can obtain from a study of Continental and American hospitals, but I will not say more at the present time than to suggest that we might emulate the Germans in the provision of grounds and gardens. The value of environment as an important factor in the treatment of disease is, I believe, well recognised, and when one has seen the lay-out of the grounds and gardens in such hospitals as those at Berlin and Cologne, one cannot help but contrast them favourably with the majority of our own institutions. I am well aware, however, that the out-patient departments attached to our general hospitals necessitate the sites being in the centre rather than in the suburbs of our cities. I have always been struck by the fact that, as a rule, our Poor-Law infirmaries obtain excellent sites in the suburbs; and if, as seems probable, recent legislation is going to considerably affect our out-patient departments, we may hope that in the future our general hospitals may be able to obtain suburban and larger sites.

In concluding, I would take this opportunity of expressing my sincere thanks to the many architects who have so kindly assisted me and furnished me with plans and information, and to the very many members of the medical profession and to the staffs of the institutions which I have visited for their very kind assistance and courtesy.

DISCUSSION OF THE FOREGOING PAPERS.

MR. ALFRED W. S. CROSS, M.A.Cantab., *Vice-President*, in the Chair.

MR. EDWIN T. HALL [F.], in proposing the vote of thanks, said he did not think they had ever had at the Institute more interesting papers on so highly technical a subject. The wonderful display of hospitals on the Continent and in America which Mr. Milburn had given them was most educative. He could not pretend to criticise the designs, for it would take a month of Sundays to do so, and he would therefore confine his observations to general principles. For instance, with regard to the block plan of a hospital, it depended entirely upon the available site. If a considerable area of land could readily be had, naturally it was advisable to build one-storied pavilions. But they could not always afford to do that. If a hospital had to be built in a town where land was very expensive, the pavilions must be put relatively close together, and they must be more than one story in height. They would have to look upon that as a necessity. Plenty of air and plenty of sun were the main things to be provided. When that had been done, it did not matter much where the building was placed. On a town site, surrounded by roads, it was as good, from the aëration point of view, as if it were in the country. They wanted currents of air all round the building. The number

of beds per acre was not a proper standard, because if there were roads all round a site the area of those roads must be taken into consideration in dealing with the numbers per acre. In New York there was one hospital of 600 beds on four acres, that is, 150 to the acre; and though it was too closely packed they would get excellent results there if they kept their windows open and treated their patients, so to speak, in the open air. At Manchester they had 600 beds on thirteen acres, and that gave the ideal Mr. Snell contended for, of fifty beds to the acre. The Nouvelle Pitié Hospital in Paris had sixty-six beds to the acre, and at Cincinnati there were 1,400 beds on twenty-seven acres, which was about fifty-two per acre. In the case of a high building in towns, there must be plenty of open space about it. He had himself put up a building right in the heart of London—viz., the wing of the Homœopathic Hospital. There was a space of 180 feet between the building and the houses on the opposite side of the street, and it was 120 feet to the nearest building in a straight line in another direction. The building was seven stories in height, yet it was as well aërated as if it were in the country. Mr. Pite, at King's College Hospital, had got roads on two or three sides, and

open land close by, so that there was plenty of air to his site. In University College Hospital there was a great deal of air by reason of its shape and because it was surrounded by roads. With regard to interspacing, that again depended upon the openness of the country around. At the Rixdorf Hospital, there was 66 feet space between the wards, at Johns Hopkins 60 feet, at New York 55 feet, at Manchester 65 feet, and at Camberwell 90 feet. The sites were so open that they gave ample and splendid aëration. At Manchester there was an angle of 25 degrees of light to the lowest window cills, and to the lowest window cills in the three-storied buildings there was an angle of 37 degrees, which was satisfactory. With regard to the unit principle, this meant that in a large hospital one surgeon with his assistant would have one division of the hospital, consisting of a certain number of beds for women and a certain number for men, and the theatre and all apparatus rooms necessary for that division. The unit was, to all intents and purposes, a separate hospital within a hospital. This applied also to the medical side. If the building must be of more than one story, the staircases ought not to communicate between the various floors so that the foul air from the lower one would ascend into the wards above. In Manchester there were only two staircases for the whole main hospital, and they were away from the wards, and were connected by glass-covered ways from end to end. It was suggested in some of the American hospitals that they should lodge the resident medical officer in the units. He did not think English doctors would approve of that; they might as well arrange for the nurses to lodge over the wards; when the doctor was off duty he should be away where he could get refreshment for his mind. This was not specially a medical question, but rather one of common sense. With regard to the pavilion *versus* the corridor principle, slides had been shown of modern hospitals in Germany where the corridor principle was adopted. This, after all, was only a reversion to what had been done here thirty or forty years ago, and longer. To show how wasteful it was, he had measured up a few of these corridors. In Munich No. III. Hospital there were 170 feet run of corridor, 10 feet wide, and thirty beds. That meant for every bed in the hospital 5 feet 6 inches run of corridor. Cincinnati on the pavilion principle, 70 feet to 29, which was only 2 feet 4 inches per bed. At the Camberwell Hospital they had 44 feet for thirty-six beds, which was only 1 foot 3 inches of corridor per bed. At Leeds Hospital there were 16 feet to thirty beds, or only 6 inches per bed. The question of cost was a very important matter in hospitals, therefore the pavilion principle was far cheaper, and from the point of view of efficacy he suggested it was better, because with buildings on the corridor system they only got the sun from one side—generally the south—which meant that sunshine was in the ward

only for a certain number of hours each day. But with the pavilions placed north and south the sun, from its earliest rising to its setting, was on the big ward; it went round it. Therefore there was more sunlight to a large ward on the pavilion than on the corridor principle. As to the number of beds in a ward, Mr. Milburn said that one of the American doctors suggested a six-bed as the ideal sized ward, and he had shown German wards with twelve beds. That was all very well, but the nursing cost was so great that he doubted very much if the doctors would say they could afford such expensive hospitals. We in England had from twelve to sixteen and even twenty-four beds, and in some of the older types there were twenty-eight beds in the biggest wards. What he thought was the best system was having a large ward and three or four smaller wards attached, so that the patients might be separated. At Manchester in a pavilion they had sixteen to twenty-four beds in the largest wards, and there were two-bed wards and four-bed wards. Mr. Pite at King's College Hospital had an arrangement something like that. In the Johns Hopkins Hospital there were twenty-four beds in the big wards, and they had two private wards which were a long way off. Our modern infirmaries were greatly in advance of the old Poor-Law buildings, and corresponded very much with the German buildings. At Camberwell they had one twenty-four-bed ward, one two-bed, one four-bed, and one six-bed ward as the unit; and that was served by one staircase. For the past ten years we had had roof gardens in English hospitals, and patients doing well on them, and he showed a photo of one of his own so treated. So that was not an American idea. The position of the sanitary towers depended on the site and the arrangement of the wards. In the case of one big ward, with a single isolation ward of two beds, a very useful position was at the extreme end. But in the case of several small wards the towers should be kept at the home end. In some of our own hospitals, as at Manchester, for instance, they had them at the end. At Leeds they had them at the end because the big ward was practically the only ward. At Camberwell they had them right in the centre; the towers were at the home end of the big wards. It all depended on how they were arranging the plan. It was suggested that these sanitary towers were undesirable. With regard to the bathroom, he agreed there was no great importance in that. But as to the closets and sink-rooms, he strongly deprecated any idea of their being placed directly opening either out of the ward or out of an enclosed corridor immediately on the ward. These apparatus sometimes got out of order, and he felt sure that medical officers of health would agree with that view, as did most of the architects with whom he had discussed it. In the Cologne hospital the closets were next door to the ward kitchen, their windows being on the

same plane. If there was a sluggish atmosphere, the foul air from the water-closet would be drawn by the superior warmth of the kitchen into the kitchen window, and he could not imagine a more insanitary condition. With regard to the position of the sanitary towers, in the Moses Taylor, Pennsylvania, the tower was in the centre, and at the new Bradford it was in the centre. But hospitals with end towers existed all over the country. At the Royal Derby, designed by Mr. Keith Young, which he had always looked upon as an excellent hospital, they were at the extreme end, and so they were at Rio Tinto, Teheran, Edinburgh, and other places. In Germany all the best and most modern hospitals had detached towers. It was only in the hygienically more backward hospitals that water-closets were otherwise placed. He had discussed this matter with the doctors of the hospitals where this occurred and found that they objected to the arrangement in the highest degree. One great new hospital close to Munich had four or six closets in a room, and one window only, and that in the heart of the place. In Nuremberg, one of the finest hospitals he had seen, they did not have a little cut-off, as we do; they had a great ante-room, with windows blowing right through, out of which the closets are entered. In some of the places in Munich, and in Dr. Goldwater's, one had to walk from the ward across the main corridor, which was very long and very draughty, with open staircases. Every patient from every ward had to go across this corridor to get to the water-closet. It was not private, and therefore not nice for the patients themselves. As to the disconnection of pavilions, the Germans used to have them absolutely disconnected, but he was glad to hear from Mr. Milburn that now they were connecting them by corridors. He thought it was a mistake to have enclosed corridors; they should be covered open ways, which was a fair compromise between the two. The tendency in England was to cut down the cost of hospitals, and as hospitals might presently come under either Government or municipal control it would be necessary to cut down the cost. The best way to do that was to cut down the cube given to each bed. Dr. Boobbyer had been nursing patients with all kinds of diseases in spaces which came to something like a thousand cubic feet for each. At the Pasteur Hospital in Paris, the cubicles, in which they had all kinds of infectious diseases, were 10 feet by 8 feet only, that is, 80 feet super and 1,000 or rather more cubic feet. Under the modern system of treatment in the open air the windows were kept wide open, and a large cubicle was not necessary. Only sufficient room was wanted for the doctor and nurse to be able to move about. It was in that way, he thought, that they would have to reduce hospital cost.

Dr. PHILIP BOOBYER, Medical Officer of Health, Nottingham, rose at the instance of the

Chairman to second the vote of thanks. He had listened, he said, with pleasure and profit to the reading of both papers, which teemed with information invaluable to persons like himself. Under ordinary circumstances he would have felt disposed to follow the authors at some length in discussing several of the more important questions they had raised in the wide fields they had each of them traversed, but as the hour was so late he proposed to confine his remark to one topic alone—viz., that of fresh-air and open-air treatment. People like himself responsible for the management of large isolation hospitals had been much exercised in recent years with the necessity of reducing to a minimum the obvious disadvantages attendant upon the aggregation of all types of cases of acute specific diseases at various stages in large common wards at the same time. Various solutions of the problem here presented had been suggested. Attempts had been made to separate the cases according to type or stage, but such expedients were alike impracticable and undesirable. It was obviously bad practice, for example, to aggregate together acute, severe, and septic cases in common wards. Small separate (box) wards for individual cases, like those of the Pasteur Hospital (with nursing methods similar to those of the Barrier System), had been advocated and tried, but, while such a method was practicable for an exemplary establishment like the Pasteur Institute, it was unworkable in ordinary isolation hospitals like those of our own provinces, where expense was of first consideration, and the numbers of cases to be dealt with continually fluctuating widely. In his own hospitals he had endeavoured to solve the difficulty by fresh-air treatment. This had been provided by free ventilation through open doors, windows, etc., in the first instance, and by actual open-air conditions later. Some eighteen years ago he had nursed acute and severe cases of pneumonia, scarlet fever, and small-pox in the open air, in freely ventilated corridors, or in bell tents with raised curtains, and with the best results, and the practice or experiment had been continued upon an ever-increasing scale down to the present time, when, so far as his own district was concerned, it was regarded as a perfectly orthodox and desirable method of treatment. In persuading the nursing staff to abandon their time-honoured belief in the necessity of a high temperature for the ward atmosphere in cold weather he had to overcome considerable prejudice. But this belief once abandoned, together with all attempts to live the dual life of in- and out-door plants at one time, the transition from the freely cross-ventilated ward to the open verandah was rapid and easy. The principal isolation hospital of Nottingham was made up of widely separated single-storied pavilions communicating with one another by means of cross-ventilated corridors several hundreds of yards long, with frequent openings for roadways. These corridors

were used during many years for the accommodation of cases of various kinds, and had proved highly serviceable as observation wards for doubtful cases or as special isolation wards for cases of incidental diseases. The discomfort from draughts in these corridors had been obviated by screens; nothing but the draughts had ever been complained of, and the patients so nursed had done better than those in the closed wards. Of late years, all sorts and conditions of patients had been nursed in the open air on verandahs attached to the sides of the pavilions. The first of these permanent verandahs was erected in 1903, the latest only a few months ago. In March 1911 Dr. Franklin Parsons, Second Medical Officer of the Local Government Board, visited and inspected the principal Nottingham isolation hospital at which this open-air treatment had been carried out, and after a careful inquiry and examination of cases and records stated in his report to the Board (published in 1912) that he had not seen or heard in the course of his inquiry anything inconsistent with his (Dr. Boobhyer's) statements respecting the favourable effect of open-air treatment upon all classes of cases. He also expressed concurrence with Dr. Boobhyer's view that the heat-controlling centre of our human mechanism is capable, even in disease, with adequate food and clothing, of adjustment to wide variations of external temperature. In health we know that such adjustment occurs. The late Captain Scott and other Arctic and Antarctic explorers had recorded, indeed, that after an experience of low minus-temperatures, they and their companions had felt comparatively warm and comfortable with the temperature oscillating just above and below freezing point. On Wednesday last a large number of members of the Society of Medical Officers of Health, and members of Local Authorities, visited the hospital with the view of inspecting the open-air system at work and obtaining information concerning it. They and others who had visited the Nottingham Hospital singly or in small parties during recent years had also expressed themselves as satisfied that the claims made for this system were justified by facts. One of the most remarkable facts about it was this—that many of those diseases for which a warm, still, atmosphere was usually said to be necessary, *e.g.*, nephritis, lobar pneumonia, and catarrhal pneumonia after measles and whooping-cough, did better in the open air than in the wards. He (Dr. Boobhyer) should not soon forget the joy and gratitude of an American gentleman and his wife, from Los Angeles, in 1906, at the recovery of their only child from an attack of scarlatina-anginosa, contracted in a Nottingham hotel where the patients were staying in the course of their travels. His friends Drs. W. B. Ransom and S. E. Gill of Nottingham called him to see the case with them, and he advised open-air treatment at the isolation hospital. This was agreed to by the parents, and

carried out consistently during three months of a fairly hard winter; and the child made a perfect recovery, with no complications, excepting an ear discharge, which ultimately cleared up completely with the preservation of normal hearing. He did not expect this child to recover, and he certainly did not think it would have done so if nursed inside the hospital. There was plenty of incidental evidence in favour of open-air treatment. He might remind them that Mr. Saxon Snell had given them a good account of *al fresco* hospitals that evening; Defoe, in his History of the Plague two hundred years ago, had done the same; and we had the whole of the present-day sanatorium movement to the same effect. Fresh air as a potent factor in medical treatment had come to stay, and we must modify our designs of hospitals—and houses—to meet its advent. So far as the treatment of acute specific fevers in the open air was concerned, the first thing they had to do was to show that it did no harm. This, he thought, they had done. If it could be further shown to be of definite benefit in certain cases, he thought, to say the least, that enough had been shown to justify its further trial.

Mr. STANLEY BOYD, M.B., Senior Surgeon Charing Cross Hospital, said he agreed almost entirely with Mr. Hall's remarks; but he could not go so far with him as to say that piling up wards one upon another had no ill effect. He thought that the number of flats which were being run up in London did not tend to the greater health of the community. At the same time, statistics showed that we did not pay very heavily for it, and in the case of hospitals there was absolute necessity for this class of building. It was obvious that the air would rise from ward to ward, and even in the country he supposed the top ward would have air more like that of a city than would the lowest. He was much interested in what was said about the covered ways, not enclosed ways. Could they get nurses to work them? Mr. Snell would remember that he (Mr. Boyd) had brought to Charing Cross Hospital from the Paddington Green Children's Hospital the idea of an isolation department which lay entirely above the hospital and was worked by an outside lift. It was built on the model of a house in the Königstrasse in Nuremberg, and contained four rooms for nursing separate suspected diseases, and the nurses could meet only in covered balconies, but wind and rain necessitated the enclosing of these ways. At Charing Cross Hospital the floors were isolated from one another. There was a central staircase with lifts, connected with each floor by flying bridges with louvres which could not, and with windows which should not, be closed. That was the most they could do in regard to covered ways. He was very much interested in the photographs of the operating theatres which Mr. Milburn showed them as installed in some of the German hospitals. He had recently sketched a theatre for a provincial

hospital, but it was too advanced for the committee. One of the most important things for a surgeon in his work was light. They could get most light in the open air, but they could not work there; therefore he suggested a greenhouse. That was all very well if they could heat it and have blinds without dust. So he suggested two greenhouses with a space between them for heating, blinds, etc. The photographs Mr. Milburn had shown were splendid looked at from behind; but there was a wall which one was looking from, and that wall would often be the very place from which light was wanted. He had been greatly hampered by the fact that there was a wall behind him from which insufficient light was reflected. If they had a double-greenhouse theatre connected with the building by a low corridor, light could be got fairly well all round. With regard to heating, in the Charing Cross out-patient department and theatre they had a large amount of glass; the whole roof of the out-patient consulting rooms was of glass, and he had never had complaint of cold air or of moisture falling on their heads. The explanation of that was simple. There was a steam-pipe carried all the way round the bottom of the roof, which kept the glass hotter than the rest of the theatre; hence no condensation took place upon it. A good deal had been said about the need for cross-ventilation as a cut-off for the sanitary towers. It was required because their walls were thin, they got very cold, and the cold air from them rushed into the wards. If the sanitary towers were kept the warmest places, the ventilation currents would be all the other way. He preferred cross-ventilation, but even this should go towards the towers. Admittedly sewer-gas was not a pleasant thing, but it was not so desperately poisonous as was thought. It did not contain micro-organisms.

Mr. PAUL WATERHOUSE [F.] writes:—

Lack of time prevented me, and many others, from joining in the expression of thanks for the two excellent papers contributed by Mr. Saxon Snell and Mr. Milburn. I should like to offer some acknowledgment of these valuable additions to the history of hospital design and to make some observations which it was not possible to make at the meeting.

Even during the twenty-five years of my own experience as an architect very notable changes of medical opinion have influenced hospital design. One of the greatest of these relates to operating theatres. At the time when, in 1885, my late father, Alfred Waterhouse, R.A., designed the Royal Infirmary at Liverpool it was still considered desirable to give accommodation for a large number of student spectators. In 1903, the more modern notions took effect and it fell to my lot to place two theatres upon a space rather less than that occupied by one of the original operating rooms! The older fashion in theatre construction was indeed a strange enemy to antiseptic surgery. The vast floor spaces of the stepped galleries offered a

huge uncleansable surface for the harbouring of germs.

Not always have the changes of opinion been in a forward direction. When University College Hospital was first schemed it was decided as a cardinal proposition that the four radiating ward-wings were to be connected to the central block by definitely open-air bridges, and the same arrangement was to prevail at the connections between the wards and the sanitary towers. But before the building was finished it was decided that the nursing staff could not live up to this hardy ideal, and the bridges were closed in with screens and windows, which partially diminish the value of the system. The "cut-off," as a separation between the wards and those departments that require drainage, has been until recently the key to modern hospital planning in England, but it seems that in this matter we are lessening the stringency of theory. Not so many years ago a well-known surgeon in the north of England went the length of saying that he would never perform an operation within reach of any waste-pipe, however innocent. But the gradual realisation of the fact that the value of doctors' and surgeons' ablutions entirely outweighs the hypothetical danger of well-trapped wastes has changed all that, and washhand basins are now essential features both in wards and operating rooms. The relaxation of theory which now permits even w.c. blocks to adjoin ward buildings without cut-off ventilation appears to me at least hazardous; but there is much to be said for the desirability of placing such accommodation in such a position as to serve the small wards of the unit as well as the large ward.

A most important step in our modern practice relates to the proper isolation of out-patient departments. It is realised, I believe—and the two Papers have emphasised this—that the undue proximity of the out-patient block to the wards has greater danger than the proximity of the sanitary accommodation; and it seems likely that on town sites, where ideal conditions of disposition are impracticable, there is a proper use in this connection for the much-discredited systems of mechanical ventilation. If there is a function for the plenum system, it is undoubtedly for the forcible ventilation of an out-patient block on a constricted site; but even for such a purpose extraction by mechanical means is probably better than mechanical impulsion of air.

Books Received.

- The Art of Colour Decoration.* By John D. Crace, F.S.A. [Hon. A.]. With Facsimiles of Coloured Drawings by the Author and other illustrations. 4s. Lond. 1913. 80s. net. [B. T. Batsford.]
- On and along the Thames, James I. 1603-1625.* By W. Culling Gaze. 8s. Lond. 1913. 10s. 6s. net. [Jarrold & Sons, 10 Warwick Lane, E.C.]
- Cassell's Reinforced Concrete.* Edited by Bernard E. Jones. Illustrated by 171 photographs, and about 600 diagrams and working drawings. 4s. Lond. 1913. 15s. net. [Cassell & Co., Ltd.]

REPORT OF THE HOUSES OF LAYMEN AND CONVOCATION ON THE INSURANCE OF ECCLESIASTICAL BUILDINGS, 1913.

AT a meeting of the Representative Church Council held at the end of 1911, the Archbishop of Canterbury proposed a resolution, which was carried unanimously, as to the urgent necessity of a Special Committee being appointed by both Convocation and the Houses of Laymen to report forthwith upon the better Insurance of Ecclesiastical Buildings.

In conformity with this reference a Joint Committee was subsequently elected representing the Lower House of Convocation and the Houses of Laymen for the Provinces of Canterbury and York, with power to deal with this question and take evidence thereon.

The Report of this Joint Committee has now been confirmed by the Canterbury House of Laymen at the Session held on Wednesday, February 19 last, omitting, however, the final recommendation as to insurance endowment funds in commemoration of the dead by way of memorial insurance for parochial endowment.

Before giving an epitome of what has thus far in this way been decided upon as the concrete results of this timely and comprehensive inquiry on the part of the Church authorities, episcopal, clerical, and lay, it will be pertinent to mention, in parentheses, to what precise extent the Royal Institute of British Architects has already incurred an obligation in this matter. On its merits the project for the more adequate protection of ancient buildings from fire would at any time claim the moral support and active co-operation of the members of the Institute; and certainly diocesan, parochial, and other bodies charged with the responsibility of maintaining old churches and other examples of architectural importance throughout the Empire, can always rely upon the willingness of the Institute to second, to the best of its ability, any well-considered efforts with that end, such as those comprised in the Report due to the decision of the Representative Church Council to which reference is here made.

This co-operation on the part of the Institute on the present occasion is obviously more imperative inasmuch as the initial stage of this movement originated in the action taken by the Council when, on my suggestion about two years ago, it was unanimously resolved to issue a circular on the subject to all Archdeacons of the Anglican Church and other ecclesiastical authorities in England and Wales, Scotland, and Ireland, emphasising the importance of effecting more adequate insurances against fire on all ecclesiastical fabrics, as well as on the furniture or fittings of churches and their ornaments and decorative accessories.*

* JOURNAL R.I.B.A., 11 Nov. 1911, p. 22.

Public attention thus has been directed to a matter which is of no small moment from many points of view, and we are able to welcome this capital Report which has now been officially adopted. The practical question still remains to be dealt with as to how far pressure can be brought to bear on parochial authorities to induce them to make more commensurate provision by better insurances.

Architects, no doubt, can in a variety of ways assist the betterment of things in this respect by recommending their clients to reconsider their existing policies and to augment the amounts, all too limited hitherto in extent. Advice dealing with such details must, however, be made subject to the proviso as to the proportionate values of risks being made conformable with the policies on which premiums are paid, care being exercised at the same time not to incur a needless increase on the cost of current expenses.

No general rule can be advisedly laid down for general adoption as to the respective sums to be allocated in relation to the original cost of buildings or as to the precise value of their contents, and it certainly is not the business of the Institute to attempt any schedule of the kind. Each case, in fact, must be individually dealt with on its own merits, and invariably it will be found essential to consider the age and construction of the fabric, its structural conditions, its position and surroundings, and many other points such as can only be judged and decided on after a careful survey on the spot. These considerations in the first instance must be reckoned to be quite irrespective of the terms of any policy and independent of this or that particular insurance office, mutual, co-operative, or otherwise. Well-considered and efficient provisions for protection against fire are also pre-eminently important and can scarcely be overestimated, though very often they are entirely neglected.

Turning now to the Committee's Report, we find it almost starts with this headline question—"What is an adequate insurance of a church?" And by way of reply we learn that "as a general rule the fabrics and furniture of churches ought to be insured for the full amount which it would cost to reinstate them in case of destruction." That is a sound piece of advice, but as to how far walls left standing more or less intact will prove sufficiently good for retention opinions will differ, and the Report appears to assume that the walls are of brick, and nothing is said about old stone walls which possibly might be saved as work of architectural historic importance. As such, as a matter of fact, they will have been insured, though it may be fair to say that no insurance could cover the reinstatement of antiquity. On the other hand, provision should be made to go a long way towards the retention of antiquarian walling. Brick-work stands fire better than any other material, and, with this seemingly in mind, the Report

states that experience shows that the combined heat within, and the application of water from the outside in efforts to extinguish the fire, particularly if severe frost happens to follow, necessitates the removal of such brick walling even if it be not actually cracked and twisted. This must be done before rebuilding can be begun, so that, in such circumstances, so far from being an asset of value after the fire the walls become actually a source of expense. Those who have had to settle losses of this kind will confirm much that the Committee has here urged, but the main value of this part of the Report is comprised in the section where it emphasises the need of expert knowledge being obtained, and this should happen not only when the assessors have to settle the value of the loss and methods of rebuilding, but also an expert architect ought to be consulted at the outset when the insurance is effected and when provisions as to precautions to prevent fires are decided on and adopted.

The Committee strongly assert that no policy of an ecclesiastical building should contain an "average clause," and there can be no question as to the rightness of this rule.

It is also essential that the furniture and ornaments of a church should be clearly described in agreed terms, and each article should be sufficiently particularised for identification, while all these things should be insured apart from the fabric, every piece of importance having a value allocated to it by a regular schedule, and this list should be attached to the policy. This point is not quite so clearly insisted upon as perhaps it might have been. Already the Archdeacon has power to oblige the churchwardens to keep a proper schedule of all ornaments, vestments, and plate existing from time to time in every parish church, and in the Easter presentments such a list is mentioned in the series of questions to which replies are required.

In addition to the actual building risk and the covering of its contents by adequate insurance, the Report, with wise forethought, suggests that provision should be made to include architect's professional fees and other like charges, as well as the clerk of works' wages incurred in connection with the rebuilding or restorations brought about by fire. Moreover, the expense of providing a temporary building such as an iron church, in which services can be held while the damaged parish church is being reinstated, ought to be included in the insurance, together with a year's rent of sittings, too, where the income is derived by letting pews. The probable loss accruing meanwhile, in any case, in consequence of diminished church collections, should likewise be foreseen and taken into account, because current expenses will go on.

Ample reasons are set forth in the Report as to glebe buildings being insured to their full value by the incumbent, and parsonages are dealt with most

usefully with reference to Ecclesiastical Dilapidations Acts and the liabilities of the clergy in a personal sense in these matters. The Bill drafted two years ago contains provisions for the compulsory insurance of the buildings of a benefice for an adequate sum to reinstate them if destroyed by fire, and it is added that these insurances ought not to be effected solely in the personal name of the incumbent.

The House of Laymen by the adoption of this Report has realised the need therein defined of persistent action by all Archdeacons and Rural Deans in calling the attention of churchwardens to their obligations in this question of insurance, and the Report urges upon these diocesan dignitaries their official responsibility, by making periodically personal inspection of all churches, to undertake this part of their work more systematically than has hitherto been attempted save perhaps in exceptional instances.

Visitation charges and Ruridecanal conferences are alluded to as another means of bringing pressure to bear upon parochial officials whose buildings may happen to be under-insured. A permanent committee charged with the duty of inquiring into and looking after all the parochial insurances in the deanery is suggested by the Report as an additional method for bringing about an improvement. Such a body, however, could have no legal authority, and it is probable that any such concerted action would be resented strongly as being too inquisitorial, and so more harm than good might result; whereas the official status of Archdeacons has to be reckoned with, particularly when their duties are carried out in concert with the Rural Deans acting in conjunction with the Bishops.

Ultimately no doubt the pressure of public opinion will be brought to bear, and in all likelihood the laity may have to follow the matter up through Easter vestries and parochial church councils. The incumbent and churchwardens conjointly remain, meanwhile, the only legally responsible persons in each parish, and, except where the incumbent is the Rector, the actual holders, collegiate or otherwise, or the lay impropricators of the rectorial rights derived from old ecclesiastical foundations are liable for the upkeep of the chancel.

The Report does not evade the question of aid to poor parishes in relation to the expense of insurance, but it is scarcely requisite to go into that problem here. The exigency of extraneous aid cannot, of course, be ignored, where a needy agricultural parish, for example, with a sparsely scattered population is weighted with the responsibility of maintaining some splendid mediæval church or choice specimen of historic architecture, because it would be folly to expect such a poor community to insure without diocesan or other help a continuous insurance for the full sum required to reinstate such a building with its excess of accommodation for local contemporary needs

as a place of worship. The difficulty underlying the problem as a whole is not, however, so much a matter of annual costs consequent upon more adequate insurances, for they are relatively infinitesimal. The crux consists rather in the fundamental principle of the whole question, and with this aspect the Report is comprehended under the paragraph headed by this interrogatory—"What help can be given to enable parochial authorities to estimate the value of their buildings, and to find out whether they are protected against important risks under their existing policies?" By way of an answer to this very pertinent inquiry, the Committee say that "local qualified professional advice should be obtained, as to the cost of reinstatement," and as to the adequacy of existing policies Archdeacons and Rural Deans might advantageously be consulted.

Insurance offices, we are reminded in this Report, are quite ready to give free expert advice on these points without making any charges for their surveyor's fees and expenses. This, no doubt, is true enough, but, valuable as such information may be, the inherent difficulty ought to be met in a more businesslike fashion, which, to state the matter plainly, means the necessity of an absolutely impartial and independent survey dealing with the premises structurally and thoroughly. Where historic buildings are concerned, the need for such an expert survey is manifestly most imperative as the only workmanlike way of treating the matter.

The Report therefore rests on truer ground when it recommends incumbents and churchwardens to seek advice from a qualified surveyor, who, it should be added, ought also to be a qualified architect of experience in church work, and, by preference, someone ecclesiastically informed.

The risks of over-insurance are mentioned by the Committee, who, properly enough, point out that the sum legally claimable under a fire insurance on any building destroyed by fire is the cash value of the building immediately before the fire took place not exceeding the sum insured. A fire insurance is, in fact, a contract of indemnity against actual damage that may arise, and it is nothing more. "Both carelessness and fraud would be encouraged if people were allowed to insure their property for more than its value." On the other hand, it must be borne in mind that the rising cost of building of all kinds in consequence of greater taxation, enhanced price of materials, and reduced amount of labour rendered per hour, much less than that which prevailed a few years ago, renders it obligatory to maintain fully the standard of risks by insurance, and the cost of reinstatement is not in the least likely to be reduced in the future.

It is not intended here to follow the Report as to the best office in which to effect insurances. Co-operative schemes have their own advantages doubtless, but the questions of insurance risks and the amount of premiums payable ought to be

settled on their own merits, and quite apart from incidental or ulterior gains or even return of profits, unless the reduction of the yearly premiums themselves is in question, whereby the insurer might obtain the available advantage.

Burglary insurance and workmen's compensation are both mentioned in the Report. Risk from theft in a church kept open for private prayer, or larceny from the vestry or sacristy, unless accompanied by forcible entry so as to qualify the deed as burglary, would not be insured against by any ordinary policy. This fact is worthy of mention here, as few possibly may know about it.

The Report closes with some wholesome advice as to the desirability of periodical qualified inspection of the heating apparatus and of the installation of electric and other lighting, and especially on the alteration or introduction of such installations. Nothing is said about flues, though possibly this is implied, for these particular recommendations generally closely follow the lines of the Institute's own circular. The risks of imperfect lightning conductors are frequently a source of danger when their overhauling is not occasionally attended to. Hydrants are pronounced by the Committee to be always essential. Of course, in remote country parishes such a rule would need modification. Means of communication with the nearest fire-station, where any exists, should, no doubt, be arranged, and the location of the nearest call-box to the church ought to be plainly stated on the church notice-board or some conspicuous place near the main church entrance.

This Report's success, we understand, was largely due to the leadership of the Archdeacon of St. Albans, the Rev. Kenneth F. Gibbs, of Aldenham, the Archdeacons of Birmingham, Maidstone, and Exeter, also Chancellor P. V. Smith. The document was presented by the Chairman, Mr. T. G. Hughes, who signed the Report. He also gave special attention to the matter throughout. "The thing is to prevent the Report becoming a dead letter."

MAURICE B. ADAMS [F.].

20th February 1913.

REVIEWS.

EARLY RENAISSANCE DOMESTIC ARCHITECTURE.

English Homes of the Early Renaissance: Elizabethan and Jacobean Houses and Gardens. Edited by H. Ayray Tipping, M.A., F.S.A. Fo. Lond. 1912. Two Guineas net. ["Country Life," 20 Tavistock Street, Covent Garden, W.C.]

This is another series of reproductions of the admirable photographs of English houses, with the accompanying descriptions, published by *Country Life*. As such, the bulk of the book is not primarily written for architects, but for the cultivated public which takes an intelligent interest in the

subject. The different writers who describe the houses and their gardens have not architecture chiefly in view. They write for a public which admires architecture, it is true, but which is equally interested in family history, and in the hundred and one things which are associated with great houses and the life of their inhabitants. From the architect's point of view, therefore, much of what is said in these pages is surplusage, and there is no question of reading the book through from end to end as a connected whole. This drawback, such as it is, is largely discounted by Mr. Tipping's capital Introduction, which gives a short but continuous story of the period, pointed by references to the numerous illustrations.

Another respect in which architects, more particularly the inexperienced, should be on their guard is that it is no part of the original purpose of the illustrations as they appear in *Country Life* to distinguish between what is old and what is new. They represent the buildings as they now are, and many of the subjects have been so skilfully repaired that it would puzzle the most experienced to tell from the photographs alone which parts of the work are original and which restorations. Nor is it the purpose of the illustrations to present one phase of style only: consequently, although the title of the book refers to the Early Renaissance, many of the prominent examples are of later date. This is inevitable in view of the fact that in the first instance it was the house and its surroundings which were to be described, and not merely the work of a special period. To complain of the mixture would, under the circumstances, be unreasonable.

An incident in the writer's own experience lends point to the first of these warnings. A client who lived in an Elizabethan house, which had been restored by an eminent architect, became sadly out of love with one of the new chimney-pieces. In searching for something more suitable, he came across an excellent Elizabethan chimney-piece in *Country Life*. At some considerable trouble a visit was arranged and made to the ancient house where this desirable example was to be seen. A long round of rooms was examined under the host's illuminating guidance, and at length the object of the journey was reached. On inquiry it transpired that the admired chimney-piece was likewise designed by the eminent architect.

Bearing these cautions in mind, the student of architecture will find in these pages abundant material to interest and delight him. Each house is described in a monograph of its own upon which considerable research has been bestowed; and the photographic illustrations are of the very high standard associated with *Country Life*.

The essence of the book is distilled in the Introduction, which it is worth the while of every architect to read. Mr. Tipping deals with his subject from first-hand knowledge—that essential to ade-

quate treatment—and with sympathy. It is easy to decry the early efforts of Elizabethan craftsmen in an unfamiliar style; it is easy to dismiss the men as ignorant of the rules which governed the application of the forms at which they aimed. But, as Mr. Tipping points out, there is something much more than pure scholarship involved in the work of the Early Renaissance. There is a human element about it quite as fascinating as anything that scholarship produced in later years. By all means let students be trained upon the purest principles, but let them not ignore or dismiss with contempt even the misapplication of those principles in Elizabeth's time, wedded as they are to the originality, the vivacity and the poetry which distinguish that wonderful epoch. An estimate of its work, at once generous and correct, will be found in Mr. Tipping's Introduction.

Kettering.

J. A. GOTCH, F.S.A. [F.]

ANCIENT BUDDHIST TEMPLE DECORATION IN CHINESE TURKESTAN.

Altbuddhistische Kultstätten in Chinesisch-Turkistan über archäologische Arbeiten von 1906 bis 1907 bei Kuča Qarashär und in der Oase Turfan von Albert Grünwedel herausgegeben mit Unterstützung des Baessler-Instituts in Berlin. Mit 1 Tafel und 678 Figuren. Berlin 1912. Druck und Verlag von Georg Reimer. (Preis, broschiert, Mark 60.)

A royal Prussian expedition has been at work for some years exploring old Buddhist sites in Chinese Turkestan, and in this book Herr Albert Grünwedel describes the discoveries which were made by him, either alone or in association with Herr von Lecoq, during the year 1906. The expedition arrived at Kuča on 23rd January, four days later it had reached Ming Oi, near Qumtura, the first field of work, and Herr Grünwedel left Soreuq on 25th February, 1907, for Turfan and home. Much of the time was occupied in travelling, and the expedition is to be congratulated on the amount of work which was done during the time spent in exploration.

The book is illustrated with 678 illustrations in the text, of which a large proportion are representations of wall paintings and temples. The difficulty of drawing such non-Western compositions was increased by storms of sand, which filled both pen and brush, and altered the colours when mixed. In the winter of 1906-7 the cold was so sharp that the Indian ink froze while in use, and in the summer the heat was intense. Other troubles which afflicted the expedition were bad weather, earthquakes, and a plague of mosquitoes, and the Chinese officials also seem to have given trouble. The author describes the difficulties of his task in a manner which recalls the tales of English "nature-photographers," if one may compare the great with the small.

The temples are in caves in the sides or bases of escarpments in a Tertiary formation, which

weathers with a well-marked stratification, as the photographs show. Some of the caves were filled with blown sand, and others were used by the present inhabitants of the country. The results which rewarded the explorers varied very much: at some sites hardly anything was found, at others there was an abundance of material.

The caves are not extensive and they and their forebuildings (*Vorbauten*)—as far as the latter are preserved (*erhalten*)—are never or only in the rarest cases completely regular. A certain naïveté was observed in the work: thus, when large stones had been met with in the course of excavation in the line of the walls, they had been left projecting and incorporated in the design of the painted decorations.

The author divides the paintings into three styles: the first is strongly Indian, and the second is a development from it.

During this second style the temples contained a vestibule (*Vorhalle*), generally covered with a lean-to roof (*Paltdach*), and a cell (*Cella*), narrower than the vestibule, roofed with a barrel vault (*Tonnengewölbe*). Throughout the style there was one recognised scheme of decoration with a fixed disposition of the religious subjects. The style may be divided into two sub-styles which possibly indicate different periods, as in the second sub-style new colours appear in the decoration.

The third style appears to be that of another people: with it new schemes of decoration were introduced, and an alteration in the Pantheon shows that the religion was somewhat different. The inscriptions are in Chinese, in contrast with the "Brahmi" inscriptions and decorations of the former styles. Very Chinese, and vigorous in design also, is the dragon-like "tiger" from a temple in Murtuq-shu, shown on page 257.

Of architecture proper the book contains little or nothing. Its interest will be for the Orientalist, and especially for the student of Buddhism, as most of the paintings listed and described are Buddhist, while for members of the Institute the chief interest will probably lie in the decorative effect obtained by the composition of the paintings shown in the illustrations.

There is a copious Index of thirty large pages, and generally the book has been produced with German thoroughness.

Sheffield.

C. F. INNOCENT [A.].

PRICING REINFORCED CONCRETE WORK.

Estimating for Reinforced Concrete Work: a Handbook for Measuring and Pricing Reinforced Concrete. Compiled for the Use of Engineers, Architects, and Estimators. By T. E. Coleman (Major, Staff for Royal Engineer Services). 8s. Lond. 1912. 4s. net. [B. T. Batsford, 94 High Holborn.]

This book deals with the only aspect of reinforced concrete which has not been hopelessly over-written, viz. the methods of measuring and pricing.

Except the series which appeared in the *Building News* (from which this book is compiled), we do not remember having seen any comprehensive work dealing with these subjects. Its introduction in book form is accompanied by much new matter and the necessary revision required to bring the matter up to date and in conformity with the latest phase of a system of construction now incipient but developing with extraordinary rapidity.

The usual slipshod history of the origin of reinforced concrete and a very meagre chapter illustrating the various systems employed are the only stale and unnecessary matters in an otherwise invaluable book. With the exception of some unimportant details, the whole of the information throughout is exceedingly sound, and is so eminently rational that, saving the following exceptions, it almost disarms criticism.

We object to the principle of giving reinforcement, centering, and concrete under different trades. They are preferably measured together. Slabs are not commonly measured cube, and splayed angles to concrete are not measured separately. No information is given as to the best method of tabulating bars to facilitate orders to the mills, nor is the method of measuring centering stated. The statement that piles should be measured and the cost of driving them calculated at per foot cube is very unusual and misleading.

The author speaks of stirrups exceeding 1 inch diameter, and nowhere appears to realise that stirrups are never more than $\frac{1}{4}$ -inch diameter, otherwise they cannot be manufactured on the site without special appliances. He uniformly shows broken brick as dearer than crushed ballast, which is certainly not commonly experienced. His method of pricing cast concrete, including centering and reinforcement, is not in vogue and does not give any real information. In his general information regarding workmanship he fails to emphasise the very great importance of using as dry a mixture as is humanly possible. The comparatively wet mixture he advocates would give only 50 per cent. of the crushing strength at, say, six weeks that the same materials mixed drier would develop.

In view of the fact that a great deal of work is fully loaded at six weeks, dry mixing is essential. The tables of crushing strengths of concrete give no information as to what type of testing apparatus was used, or whether the materials were tested under laboratory or practical conditions, and in any case his results of concrete crushing tests are not according to common experience. There are many useful tables giving the approximate percentage of the proportions of steelwork to concrete, but curiously enough no mention is made of the relative proportion of centering. The author also fails to draw attention to "rolling margins" and the cost of cutting to exact lengths demanded by the rolling mills.

In conclusion, we would cordially commend this

book to architects and contractors about to venture upon reinforced concrete construction, and we are, moreover, confident that old hands will find in these pages data thoroughly reliable in accordance with the best and latest practice.

PERCIVAL M. FRASER [J.].

ENGLISH CHURCH BELLS.

The Church Bells of England. By H. B. Walters, M.A., F.S.A. Illustrated by 170 Photographs and Drawings. 1912. 7s. 6d. net. [Henry Frowde, Oxford University Press.]

About fifty years ago the Rev. W. C. Lukis first drew attention to the bells of our churches; and since that date many articles on the subject have appeared, together with complete accounts of the bells of twenty-three counties, in three of which Mr. Walters' name appears as joint or sole editor. It is pretty clear that Mr. Walters has studied these books and noted up references to all minor articles; and he now gives us the *crème* of those disquisitions enriched with further researches of his own. The book is not only an archaeological book: it puts the subject also in a popular aspect, and gives technical information on bells, bell-cots, belfries, and the uses of bells, including change-ringing.

The work opens with two lists of books and articles: (1) on bells generally, (2) on the bells of certain counties or districts, both confined to the British Islands and the English language. Then we have an account of some very ancient small bells, and find large bells appear in an unknown way in about the seventh century A.D. We then have an elaborate account of the mode of casting, hanging, and ringing bells, with illustrations of towers and bell-cots, and directions as to connecting the bell frame with the tower. This chapter (No. II.) is likely to prove most useful to architects. A little insight is given into the mysteries of change-ringing, and some rules for ringers in prose and verse are set out. We then have tables of all the great bells of the world, and all the great rings in England. Two chapters on the uses of bells follow, with a list of ancient *sanctus* bells. Then come three chapters (IX., X., and XI.) giving histories of the pre- and post-Reformation foundries. The latter are clear and complete. The former still present some puzzles to be solved; and the solutions which have been given of other puzzles are to some extent conjectural and may require some readjustment hereafter. The dedication of bells is described and discussed, and many Latin verses are given involving the names of saints.

The decoration of bells comes next, with ample illustrations of letters, shields, crosses, stamps, and scroll work, some very elegant, some very curious.

Two chapters follow on pre- and post-Reformation inscriptions. In the former we find lists of all the ancient bells which bear the names of their founders, and all which bear their dates. We then

hear a little concerning the loss of bells in places; and the narrative ends with a chapter on campanology as a pursuit.

An alphabetical list of bell-founders is given, and the usual indexes of names, places, and things.

The book is excellently got up, the type and the illustrations are clear, and the press has been carefully corrected. It is necessarily very condensed, but copious references are given to other works where further information may be found on many details.

AMHERST D. TYSEN.

CORRESPONDENCE.

Book-names for Building-work.

To the Editor, JOURNAL R.I.B.A.,—

DEAR SIR,—In your issue for Feb. 8, there are to be found no less than three references, by three separate writers, to modern nomenclature for our mediæval architecture. The President, in his Address to Students, alluded to the "*Sacrosanct* periods, which now appear in the guide-books in all the degraded abbreviations of '*Dec.*' and '*Perp.*,'" whilst two reviewers of books follow, referring with approval one to "the old names," the other to "the old terms." Early English, Decorated, Perpendicular, for denoting certain mediæval building-modes in this country. Of late there has seemed to be some ground for hope that these fancy names, so old as to date well back into the nineteenth century, might by-and-by die out quietly, whilst the subject of their application came to be investigated with more and more understanding and insight by students who want to know, as distinguished from those who chiefly desire to be told something. Such hope just now may be a little dimmed perhaps, for some of us, in view of the pronouncement, in favour of these so-called "old terms," by Professor Lethaby —of all men!—in his Chapter XIII., entitled "*English Gothic*," of the Vol. "*Architecture*," that he has written for the Home University Library. This little book, packed full of precious lore, which I have read and re-read with keenest appreciation, appears to me to sum up in masterly fashion the whole vast subject of Architecture from its origins down to the present moment. And with like appreciation I have read Mr. Spooner's review of the book, regretting one thing only in this review, viz., that he should confess himself ready to bow to the authority or—shall I say?—to succumb to the fascination of the writer of Chapter XIII., in regard to the terminology, therein sanctioned, for our mediæval architecture.

It is indeed with no little reluctance that I presume to put forth a humble protest against this authority which would rivet afresh, on our educational course for architects, the fetters of a system, for teaching the architectural history of our country

through the middle ages, that I regard as pedantic and believe to be obsolescent; but to me the matter now seems too serious to let slide without a word being raised on the other side. How serious the question has become may best be gathered from Professor Lethaby's own words in this book.

"In architecture more than anywhere," he says, "we are the slaves of names and categories." "The terminology relating to the history of mediæval architecture has fallen into some confusion. Although the matter may be thought to be only one of words, the present lack of agreement must be as puzzling and disheartening to the student as irritating to the scholar. Every one acknowledges that where there has been a process of continuous development, as was the case with mediæval architecture, all delimitation into periods is arbitrary." "The terms Early English, Decorated, and Perpendicular are by themselves, perhaps, not very satisfactory, but as general descriptions of the most typical forms of architecture prevailing during the three great centuries of the Mediæval Period they are irresistible." "The student needs first an anchorage in the centuries, for nothing beside them is fixed." "One quite gratuitous source of confusion has been found in linking the styles to the several kings."

Whereupon, the author proceeds to draw up in array the six "old names," standing for six periods, made to fit the six centuries from the eleventh to the sixteenth inclusive. "There is a slight awkwardness," he admits, "in that three of these names are descriptive, while the others are historical, but for the fourteenth and fifteenth centuries it would be easy to follow the model of 'Early English' and to interchange (but not substitute) such terms as Mature English or Middle Pointed with Decorated, and Late English with Perpendicular." And this is how we are to clear up confusion and make things less puzzling and disheartening to the student, less irritating to the scholar.

Better still, we may proceed to divide each of the centuries, from the twelfth to the fifteenth inclusive, into halves, using in each case the sanctioned name for work executed in the first half only of the century, whilst the blessed word transitional may be made to do duty for work executed in the second half, since "we may go on to say that the more characteristic forms of the styles so named are found in every case during the first half of each century, the latter half being a transitional era. Thus, Norman to 1150, Transition to 1200, Early English to 1250, Transition to 1300," and so on. So, now we are to have not merely one transition, as of old, but no less than four transitions; yet only the first of these four is to be recognised as The Transition. "It happens that several secondary terms in current use would serve to define most of these transitional half-century periods picturesquely, and with substantial accuracy." Accordingly, Sharpe's terms of mature age, Geometrical, Curvilinear and

Rectilinear, rather regardless of Sharpe's own dating for them, are requisitioned with others such as Fergusson's Lancastrian and a brand-new one, Yorkist, to help out Rickman's "old names"; and thus we finally get "an extended list of twelve periods"—no less—each supposed to be just half a century in length, and all duly labelled, forming "a sort of Zodiac of English Architecture."

One may perhaps be pardoned for asking, does all this make for agreement, and wherein lies the necessity for it? What is there about our own mediæval architecture in particular that calls for a Zodiac of Periods to explain it, whilst the author can treat us to the brilliant sketch in the preceding chapter, entitled "French Gothic," as well as to illuminating chapters on other schools of architecture, without needing to introduce anything more than a simple anchorage in the centuries with actual dates of the work when available? What more is called for in our case? Why all this book-made apparatus of learning to enable students of building-work to read buildings that happen to have been erected in Great Britain? The logical-minded French writers need no such aid to explain their mediæval architecture with perfect lucidity.

Of all these book-names for building-work that of Early English seems to have got most misplaced. If words are to mean what they say, if Early English be a term applicable to any of the architecture of this country, surely it should come before rather than after Norman, and be reserved to denote work done in pre-Conquest days, since the English were here first, for centuries before the Normans, and were producing an architecture of their own which, whatever its other qualities, was at any rate as English as it could be, and Early.

I am bound to confess that this last is not my very own idea, and it is but right that I should acknowledge whence I got the notion. Years ago, whilst I still held strictly to the orthodoxy of the Periods, my faith as to the term Early English rightly applying to post-Conquest work was sapped by heretical views that I picked up in the course of a short chance conversation with none other than my friend William Richard Lethaby.—Yours faithfully,

WALTER MILLARD [A.L.].

The Grievances of Architects.

To the Editor, JOURNAL R.I.B.A.,—

SIR,—The first part of Mr. Peach's letter in your last issue is excellent in its appeal to the civic spirit amongst architects, but it may be used to other purposes than he anticipates. In the latter part we come down to the bed-rock of things—"the deplorable condition of many practitioners" and the lack of "opportunity of earning a reasonable return on his capital." This condition is to be improved and the opportunity increased by throwing open all public architectural work to the outside prac-

itioner. If this were done, it is well known that the bulk of the work would be confined to half a dozen architects, and would be just as much or little machine-made as at present. Machine output is not identified solely with official architecture, nor is mind-work necessarily the prerogative of the private architect. Would the outside practitioner consent to a self-denying ordinance to do only such work as that to which he could reasonably be expected to give his mind and attention? If this were instituted, how would public work be executed by the best architects, for it cannot be contended that there would be a sufficient number of them to go round?

One wonders at times if the Institute exists only for the purpose of helping private architects out of deplorable conditions. There are numbers of its members who, through some reason or other, lack of inclination, want of capital or influence, or the immediate necessity of earning a certain income, are unable to commence private practice. The Institute should have the welfare of these in its keeping who form so large a part of its membership. To return to that bed-rock to which an Englishman refers most—one might have said all—things, it is largely the fault of the private practitioner with grievances in not providing adequate remuneration and continuity of employment for his assistants that such a state of affairs has arisen—a state of affairs in which public offices find it cheaper to do their own architectural work with the assistance of men equally well trained and experienced as the private architect. An assistant in a private office is paid not so much on the value of his work or to enable him to earn a reasonable return on his capital, but on the principle that he is gaining experience for practising on his own account. Then, having gained that experience, he finds that he is too old at thirty-five. The days have changed since the time when he married his master's daughter and was taken into partnership by his grateful father-in-law. They have changed so much that public officials, having discovered the means by which some private architects were able to turn out large masses of work, are now learning to do the same.

The advancement of Civil Architecture is not to be obtained by selfish ends. The true line is the proper training of those practising architecture, whether in private or public offices, their protection against unfair and unjust treatment, and the encouragement of the public in appreciation of the aesthetic and—let us be honest—monetary value of the art we practise.

A COMPLAINER IN A PUBLIC OFFICE.

Suggested Visit of Architects to Canada.

Toronto: 14th February 1913.

To the Editor, JOURNAL R.I.B.A.,—

DEAR MR. EDITOR,—In looking over the discussion upon my Paper on "Canadian Architec-

ture" so nicely published in the JOURNAL just to hand, I notice an omission in my reply which might be considered at least discourteous. In some way I failed to notice Mr. Mawson's excellent suggestion that "members of the Institute should visit Canada in a group," and I hasten to say how much honoured Canadian people, and particularly Canadian architects, would feel if this could be arranged. Personally, nothing could give me greater pleasure than to meet in Canada those who have been so extremely kind to me during my recent sojourn in England. I sincerely hope that such a visit may be arranged and carried out in the near future.—I am, yours very truly, F. S. BAKER [F.].

The Lighting of Picture Galleries and Museums

No. 14 A.M.P. Buildings, Cathedral Square,
Christchurch, N.Z.: 9 Jan. 1913.

To the Editor, JOURNAL R.I.B.A.,—

DEAR SIR,—Through an oversight on my part, I find that I described the illustration fig. 2, page 46 (23rd Nov. 1912), as I photographed it, not as it would appear when placed the right way up in the JOURNAL. In order to make the illustration correspond with the text, therefore, it needs to be looked at upside down.—Yours faithfully,

S. HURST SEAGER [F.].

Scottish Architecture.

20 Tavistock Street, Covent Garden, W.C.:
27th Feb. 1913.

To the Editor, JOURNAL R.I.B.A.,—

DEAR SIR,—My friend Mr. Paterson in a footnote to his admirable paper about "French Influence on Scottish Architecture" says that I claim for Stewart of Finnart the introduction of French *motifs* into Scotland, but he has misquoted me. I have claimed this honour, not for Stewart, but for Hamilton of Finnart, and am bold enough still to believe that the Renaissance in Scotland went to sleep when Hamilton's meteoric and blood-stained career came to an end.—Yours faithfully,

LAWRENCE WEAVER [Hon. A.].

Mr. Paterson writes with reference to the above: "Mr. Weaver is, of course, right in his facts; my poor excuse is that I wrote from recollection of his interesting lecture on a similar subject and under pressure for publication, otherwise the mistake in names would not have occurred. With his inferences I have perhaps more sympathy than would seem from the terms of the foot-note, but the issue is one which might be argued ad infinitum, seeing that there is nothing to prevent us both being in the right."

Erratum.—Mr. Robert G. Wilson, jun. [A.], points out that Muchall's House, referred to on p. 250 of Mr. Paterson's Paper, is in Kincardineshire, not Forfarshire.

T T



9 CONDUIT STREET, LONDON, W., 8th March 1913.

CHRONICLE.

THE BRITISH SCHOOL AT ROME.

Scholarship offered by the Commissioners for the Exhibition of 1851.

Full particulars of this Scholarship, which is of the value of £200 per annum, and ordinarily tenable for three years at the British School at Rome, will be found in the JOURNAL for 31st August 1912. Past and present holders of the Royal Academy Studentships and of the Soane Medallion, Tite Prize, Owen Jones Studentship, Ashpitel Prize, and Grissell Medal who intend to compete for the Scholarship must submit their names and addresses and birth certificates to the Hon. General Secretary, British School at Rome, 54 Victoria Street, S.W., on or before 10th March 1913.

Henry Jarvis Travelling Studentship.

This Studentship, which is of the value of £200 per annum, and tenable for two years at the British School at Rome will be awarded by the Council of the Royal Institute on the results of the competition for the Scholarship offered by the Commissioners for the Exhibition of 1851. The Studentship will be open to all Associates and Students of the Royal Institute who are under thirty years of age on the 15th September 1913. All who intend to compete, excepting those who are already entered for the Commissioners' Scholarship, must submit their names and addresses and birth certificates to the Hon. General Secretary, British School at Rome, 54 Victoria Street, S.W., on or before 10th March 1913.

Exhibition of M. Hulot's Prize Drawings.

By the courtesy of M. Bonnat, Director of the École des Beaux-Arts, Paris, M. Hulot's Prize Drawings for the Grand Prix de Rome 1901 (subject: "Une Académie Américaine à Paris") are being brought over from Paris for exhibition in the R.I.B.A. Galleries in connection with Mr. Fernand Billerey's Paper on "Modern French Architecture," to be read before the Institute on Monday the 17th March. The drawings will be on view

from the 14th to the 20th March, and all students of architecture and others interested are invited to inspect them.

The Admiralty Arch: A Representative Appeal.

The Times of the 4th March published the following letter addressed to its Editor:—

SIR,—The Presidents of the Royal Academy, of the Royal Institute of British Architects, and of the London Society desire to associate themselves with the wish that has been expressed in Parliament and the public Press for a worthy completion of the Trafalgar Square entrance to the Mall.

The Admiralty Arch marks the entrance to the processional approach to the Queen Victoria Memorial and to Buckingham Palace. It is an essential part of a memorial scheme extending from Trafalgar Square to the Palace, and failure to finish the scheme by a suitable entrance from Trafalgar Square would, we submit, be a deplorable mistake. We appeal to those in authority to arrange for the completion of this great public improvement by means of an adequate approach, before the opportunity is irretrievably lost.—Yours faithfully,

EDWARD J. POYNTER,
REGINALD BLOMFIELD,
PLYMOUTH.

At the Meeting of the London County Council on the 4th inst. a recommendation from the Improvements Committee was submitted that they should be instructed to submit a scheme for the extension westward of the street-widening in connection with the Mall to Charing Cross improvement, including the provision of suitable architectural treatment, and to confer with the First Commissioner of Works, the Westminster City Council, and such other authorities as might be necessary. An amendment was carried by a large majority instructing the Committee to confer with the other authorities first and afterwards to submit a scheme.

The Safety of St. Paul's.

The Parliamentary Committee of the London County Council have had under consideration the opposition of the Dean and Chapter of St. Paul's Cathedral to the proposed tramway subway under St. Paul's Churchyard, and report to the Council as follows:—

We are of opinion that in view of all the circumstances, the Council would be well advised, from the Parliamentary point of view, not to proceed further with the scheme for the present, and we submit a recommendation that the provisions relating to the scheme be withdrawn from the Bill for the Session of 1913. Our recommendation covers the proposal for the construction of tramways across the bridge as well as the proposal for the construction of the subway. We consider it desirable that the Council should withdraw the whole scheme. It is not proposed to construct the new bridge until after the reconstruction of Southwark Bridge has been carried out, and it is probable that at least six years will elapse before the completion of the improvement. This will leave ample time to discuss

the question with the City Corporation and to devise some scheme which, while securing to the travelling public the advantages resulting from the construction of the tramways in the City at this important traffic point, will remove any kind of doubt as to injury accruing therefrom to such an important national building as St. Paul's Cathedral. The Improvements Committee concur in our suggestion, and the Highways Committee have informed us that, in view of the terms of the petition presented by the City Corporation against the Bill, they very reluctantly acquiesce in the withdrawal of the clauses from the Bill. . . . We desire to emphasise the fact that our recommendation is submitted entirely without prejudice to the views that may be held as to the engineering features of the present scheme and solely on the ground that new circumstances have arisen which demand consideration, and that the time available before the Council's Bill will come before a Committee of Parliament does not permit of adequate consideration being given to the subject.

This report was considered at the Meeting of the London County Council on the 25th February, and the recommendation of the Parliamentary Committee was adopted by 65 votes to 51.

The Guardianship of Cathedrals.

In the sitting of the Lower House of Convocation, on the 21st February, the Archdeacon of Ludlow moved that the proposed inclusion of cathedrals in the Ancient Monuments Consolidation and Amendment Bill among those national monuments which may be placed by the Commissioners under the guardianship of the Office of Works should be strenuously opposed. He said there was no justification for the Government taking over the care of the cathedrals.

Canon Newbolt said that his experience as a member of the Chapter of St. Paul's Cathedral in dealing with public bodies had not been a pleasant one. Three times they had had to resist schemes for public improvements which threatened disaster to St. Paul's in the undermining of its foundations. There was a great tendency among public bodies to ignore the interests of cathedrals, and to serve what they considered to be the public interests for the time being.

The resolution was carried unanimously.

Church Restoration.

At the same sittings, on the motion of the Archdeacon of Ludlow, the following resolution was passed:—"That it is desirable that in every diocese a competent advisory board should be appointed by the Bishop, which should be consulted before a Faculty is issued for any structural alterations in our ancient churches."

Public Works and Contractors Exhibition, 1914.

The Council of the Royal Institute has accorded its patronage to the Public Works and Contractors' Exhibition proposed to be held in London in March, 1914. The exhibition will be devoted to the requirements of contractors for public and municipal works. The offices of the Exhibition are at 104 High Holborn.

University of Sheffield : Department of Architecture : Vacation Courses.

Much useful work has resulted in the past from the Easter and Summer Vacation Courses held in connection with the Department of Architecture at the University of Sheffield under the general direction of the Lecturer, Mr. W. S. Purchon [A.]. The object of the courses, which are open to all students of architecture, is the study of buildings of architectural importance by means of the making of sketches and measured drawings *in situ*. Special advantages are that permission to sketch and measure a series of important buildings is obtained, all difficulties as to the use and hire of ladders, &c., are avoided, and an instructor is present with the students to give such advice and guidance as may be needed. Easter Courses have already been held in Lincoln, Stamford, and Bath, and Summer Courses in Oxford, Cambridge, and London. The Easter Course, which lasts from a week to ten days, will be held in Painswick and district this year, commencing on 4th April 1913. Visits will be paid to some or all of the following places in the neighbourhood:—Gloucester, Tewkesbury, Deerhurst, Cirencester, and Fairford, and permission has been obtained to sketch or measure at several interesting buildings. For the Summer Course, 1913, a tour in France is being arranged, in conjunction with the Rev. Dr. West [A.] (author of *Gothic Architecture in England and France*). The tour will begin about 4th August, and will last about sixteen days. The route suggested is Paris, Troyes, Sens, Auxerre, Vézelay, Semur, Dijon, Autun, Nevers, Bourges, Blois, Orléans, Chartres, Paris. Students desirous of attending either Course can obtain all information from the Lecturer at the University.

Cost of L.C.C. Architecture.

At the Meeting of the London County Council on the 18th February, in reply to a question as to the cost of the Council's architecture, it was stated that under ordinary circumstances the percentage of the cost of the staff engaged on new school buildings, including establishment charges, is less than half the scale laid down in the R.I.B.A. Schedule.

R.I.B.A. Prize Drawings in the Provinces.

The following selection from the premiated designs and drawings in the Institute Prize Competitions will be exhibited during the next few months under the auspices of the Allied Societies:

Royal Institute Silver Medal (Measured Drawings).—Drawings of Blenheim Palace (2 strainers), by Mr. H. C. Mason (under motto "Pax"), awarded the Silver Medal and Ten Guineas; drawings of the Church of St. Agnes, Cawston, Norfolk, (2 strainers), by Mr. B. P. Gaymer (under motto "Burmah"), and of Southwell Minster (1 strainer), by Mr. W. L. B. Leech (under motto "Mitre"), each awarded a Certificate of Hon. Mention.

Soane Medallion.—Designs for a Terminal Railway Station: 3 strainers by Mr. J. M. Whitelaw (under motto "Solertia Ditata"), awarded the Medallion and £100; 3 strainers by Mr. R. W. Cable (under motto "Registered Luggage"), and 3 strainers by Mr. H. C. Bradshaw (under motto "Rocket"), each awarded a Certificate of Hon. Mention.

Owen Jones Studentship.—Drawings by Mr. W. Harvey (2 strainers), awarded the Owen Jones Certificate and £100; drawings by Mr. H. P. Huggill (1 strainer), drawings by Mr. Ivor Beaumont (1 strainer), drawings by Mr. W. M. Keesey (1 strainer), each awarded a Certificate of Hon. Mention.

Pugin Studentship.—Drawings by Mr. W. Paterson (2 strainers), awarded the Medal and £40; drawings by Mr. J. Hill (1 strainer), drawings by F. E. Howard (1 strainer), each awarded a Certificate of Hon. Mention.

Tite Prize.—Design for the Façade of a Royal Palace: 3 strainers by Mr. C. A. Farey (under device "Palladio"), awarded the Tite Certificate and £30.

Honours and Appointments.

Mr. Edwin L. Lutyens [F.] has been elected Associate of the Royal Academy.

The Council have appointed Messrs. John W. Simpson [F.] and Raymond Unwin [F.] as delegates to the International Congress and Exhibition of Town Planning to be held at Ghent in the month of July next.

MINUTES. IX.

SPECIAL GENERAL MEETING (ROYAL GOLD MEDAL).

At a Special General Meeting, summoned under By-law 70, for the election of the Royal Gold Medallist for the current year, and held Monday, 3rd March 1913, at 8 p.m.—Present: Mr. E. Guy Dawber, *Vice-President*, in the Chair; 10 Fellows (including 5 members of the Council), 15 Associates (including one member of the Council), and one Licentiate—the Chairman moved, Mr. W. Henry White [F.] seconded, and it was

RESOLVED, by acclamation, that, subject to his Majesty's gracious sanction, the Royal Gold Medal for the promotion of Architecture be presented this year to Mr. Reginald Blomfield, A.R.A., for his executed works as an architect and for his contributions to the literature of Architecture.

The Special Meeting then terminated.

BUSINESS GENERAL MEETING.

At a General Meeting (Business) held Monday, 3rd March 1913, following the Special General Meeting above recorded and similarly constituted, the Minutes of the Meeting held 17th February having been already published, were taken as read and signed as correct.

The decease was announced of Percy Richard Bradford, *Licentiate*.

The following candidates were elected by show of hands under By-law 10:—

AS FELLOWS (11).

ALLSOP: George Wilfred [A. 1902], Auckland, N.Z.
GILL-KNIGHT: John Albert [A. 1891].
GREENOP: Edward, P.A.S.I. [A. 1895].

MACKENZIE: Alexander George Robertson [A. 1901].
SCORER: George Oakley [A. 1895].
SPALDING: Reginald Henry [A. 1900].
STRATTON: Arthur James, F.S.A. [A. 1896].
STREATFEILD: Granville Edward Stewart [*Licentiate*].
WALFORD: William John [A. 1901].
WARD: Charles Frederick, Assoc.Inst.C.E. [A. 1902], Newport, Mon.
WIDDOWS: George Henry [A. 1904], Derby.

AS ASSOCIATES (40).

ALLEN-LODGE: Albert Robert, F.S.I. [*Special*].
ANDREWS: Percy Maguire [S. 1910].
BARROW: John William [S. 1910].
BLENKINSOPP: Henry Joseph [S. 1908], Selby, Yorks.
BREWERTON: Frank Asquith [S. 1908], Manchester.
BUCKNELL: Leonard Holcombe [S. 1908].
BUTLER: Arthur Stanley George [S. 1912].
CHISHOLM: David John [S. 1910].
COLE: Leopold Edmund [S. 1910].
COOPER: Archibald [S. 1906], Newbury.
DEWHIRST: Ralph Henry [S. 1908].
FOSTER: Thomas Oliphant [*Special*].
GIBSON: Edmund Herbert [S. 1909], Harrogate.
GOLD: Hugh Andrew [S. 1911].
GORDON: Charles Black [*Special*].
HINTON: John Garfield [S. 1911], Winchester.
INGRAM: T. Frederick [S. 1903].
MEADOWS: Samuel Douglas [S. 1908].
MILBURN: Stanley Wayman [S. 1910], Sunderland.
MOORE: Harold Edward [S. 1911].
MURRAY: Colin Hay [S. 1906], Eastbourne.
NEWTON: William Godfrey [S. 1911].
PEASE: Alex. [S. 1910].
PHILLIPS: Rees [S. 1911].
PIGOTT: Richard Mountford [S. 1909].
RAHBULA: Ernest Alexander Rahles [S. 1908].
REID: Claud Boileau [S. 1911].
ROBERTS: Thomas Leonard [*Special*], Sunningdale.
SCOTT: Harold Seymour [*Special*], Birmingham.
SOLOMON: Henry [S. 1907], Shrewsbury.
STENNER: William James [S. 1904], Bristol.
SULLIVAN: Basil Martin [*Special*].
SUTHERLAND-GRAEME: Alan Vincent [S. 1909].
THOMS: William George [S. 1910], Nottingham.
WAGHORN: Sidney Stanley [S. 1904].
WALGATE: Charles Percival [S. 1905, *Grissell Medallist*].
WEEDON: Harry William [*Special*], Birmingham.
WEINBERG: Judah [S. 1911].
WILLIAMS: David [*Special*], Salisbury.
WILLIAMS: Stanley Hurst [S. 1910], Sheffield.

The Secretary made an announcement *re* the Henry Jarvis Travelling Studentship [see p. 314].

The Business Meeting then closed.

SPECIAL GENERAL MEETING (ALTERATION OF BY-LAW).

At a Special General Meeting summoned by the Council under By-law 65, and held Monday, 3rd March 1913, following the Business General Meeting above recorded and similarly constituted, the Chairman announced the object for which the Meeting had been called—viz. to consider the Council's proposals for amending By-law 27, so as to make provision for the permanent representation of the Royal Institute of the Architects of Ireland on the Council of the R.I.B.A., and to authorise the Council to take the necessary steps to obtain the sanction of the Privy Council to such amendment—and stated that, suggestions having been made by several of the Allied Societies that the whole question of the representation of such Societies should be further considered, the Council had decided to withdraw the Resolution of which notice had been given pending the further consideration of the question.

The matter for discussion having thus been withdrawn, the Meeting separated at 8.20 p.m.

